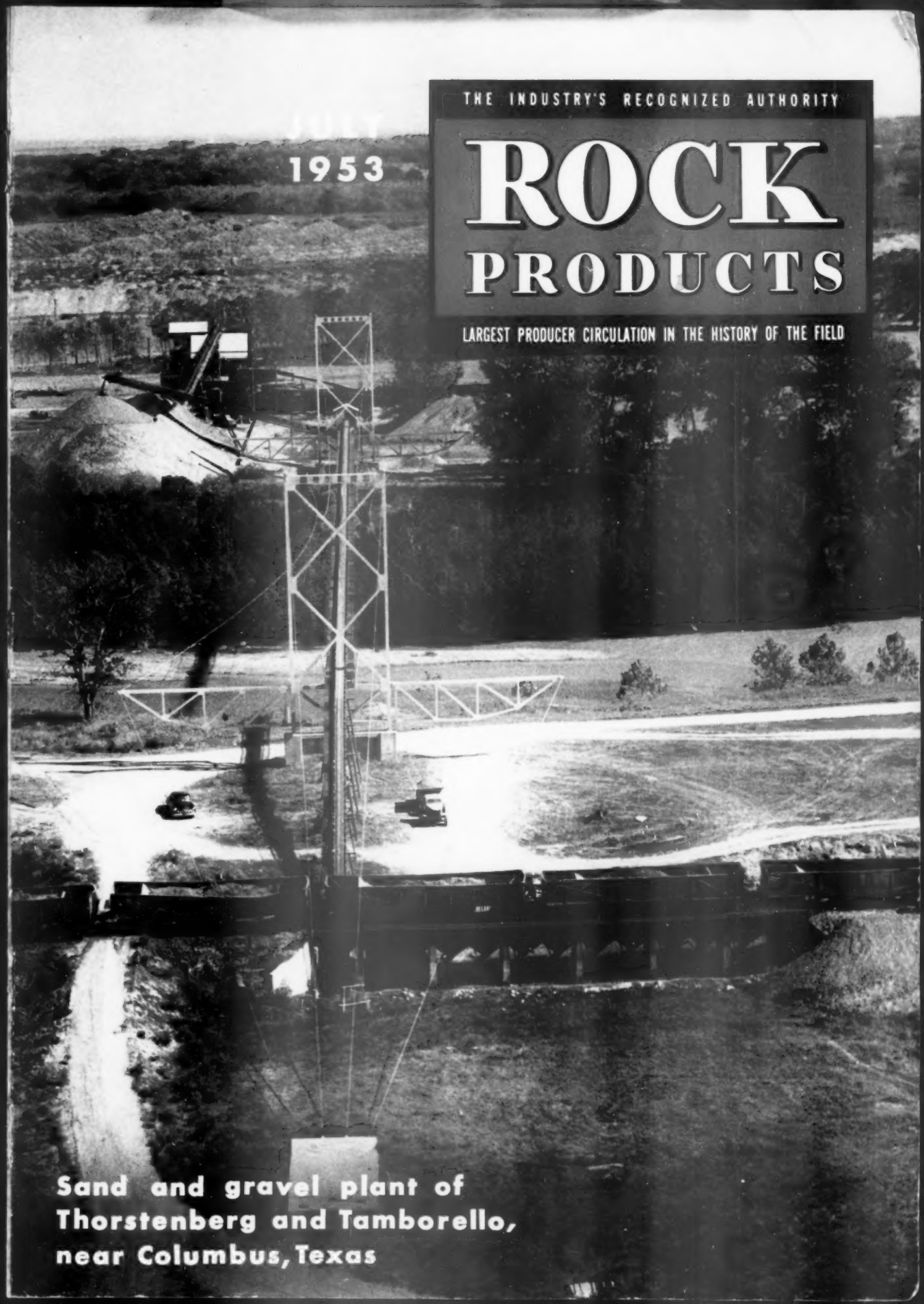
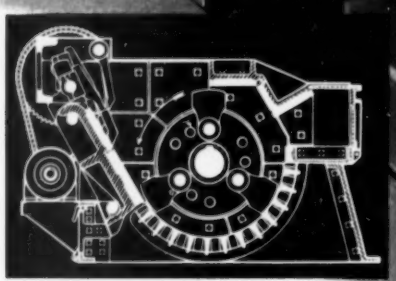

THE INDUSTRY'S RECOGNIZED AUTHORITY
JULY
1953
ROCK
PRODUCTS
LARGEST PRODUCER CIRCULATION IN THE HISTORY OF THE FIELD
Sand and gravel plant of
Thorstenberg and Tamborello,
near Columbus, Texas

CRUSH POWER-SHOVEL-LOADED ROCK TO SIZES DOWN TO 3/4" IN ONE OPERATION !

WILLIAMS SUPER SLUGGER

... CUT CRUSHING COSTS AS MUCH AS 50%!
... REDUCE INVESTMENT AS MUCH AS 75%!



Cross section of Super-Slugger equipped with "Pusher Feeder" non-clog device for maximum feeding of sticky or wet materials through crusher.

A Hammer Mill as powerful, big and rugged as they come! Takes stone as large as 2½ yard dipper can handle and crushes it with power-packed hammer blows to 2", 1¼" or ¾"—even down to feed size for fine grinding—in a single operation! Capacities range up to 550 tons per hour.

One Super-Slugger will actually do the work of an ordinary primary crusher plus several secondary reduction machines — do it faster and better—and far more economically! All expense of extra foundations, housing, conveyors or elevators, and drives, is entirely eliminated. Power requirements are much less. Exceptionally large shafts, extra heavy manganese steel liners and breaker plates, shock and wear-resistant reinforcing—all reduce upkeep and downtime, depreciation and wear to absolute minimums.

If you're in business for PROFIT, you can't afford NOT to know what the Super-Slugger can do for you!

OTHER WILLIAMS EQUIPMENT

HAMMER MILLS in many types and sizes for any requirement . . . ROLLER and IMPACT MILLS for fine grinding to any mesh, even to micron sizes . . . HELIX-SEAL HAMMER MILLS for dust-free grinding and for wet, sticky, greasy materials . . . DRYER MILLS for grinding wet materials down to 400 mesh . . . AIR SEPARATORS . . . VIBRATING SCREENS . . . COMPLETE PLANTS for crushing and grinding.

Write For Brochure

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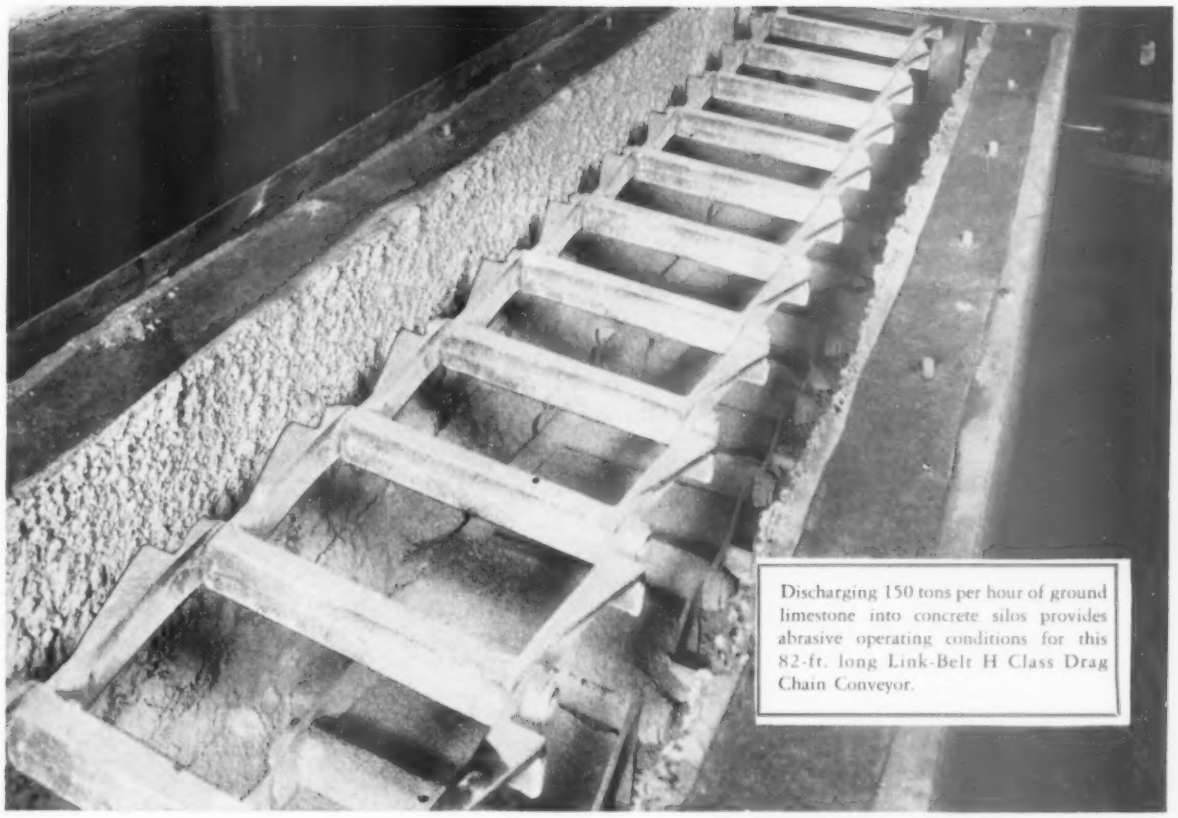
800 ST. LOUIS AVE. St. Louis 6, Mo.

WILLIAMS

CRUSHERS GRINDERS SHREDDERS

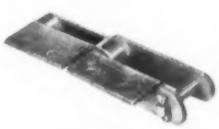
OLDEST AND LARGEST MANUFACTURER OF HAMMER MILLS IN THE WORLD



Discharging 150 tons per hour of ground limestone into concrete silos provides abrasive operating conditions for this 82-ft. long Link-Belt H Class Drag Chain Conveyor.

What is the right chain for your drive or conveying job?

Typical chains from the complete LINK-BELT line



Class SS bushed roller chain with straight sidebars—for practically any conveying or elevating service.

Class 800 ley bushed chain—for heavy duty, severely abrasive conveying and elevating.

Class C combination chain—popular, durable, low cost design for elevators, conveyors.

Class SS bushed chain with straight sidebars—particularly suited for heavy duty elevator service.

You'll find the answer in LINK-BELT's complete chain line... a size and type for every need

WHETHER it's a high-hp, heavy-impact drive or relatively slow-speed conveying service—you can get the *one* chain that best meets your needs from Link-Belt's complete chain line. Our engineers will be glad to work with you—help you select the right chain for your requirements. And you can be sure that any Link-Belt chain you buy is quality-built for longer life.

LINK-BELT

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LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle, Toronto, Springs (South Africa), Sydney (Australia). Sales Offices, Factory Branch Stores and Distributors in Principal Cities. 13.209-44

ROCK PRODUCTS

JULY, 1953 — THE INDUSTRY'S RECOGNIZED AUTHORITY — VOL. 56, No. 7

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Editorial Consultant

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ROCK PRODUCTS is published monthly by MACLEAN-HUNTER Publishing Corporation, 309 West Jackson Blvd., Chicago 6, Illinois; Horace T. Hunter, President; P. D. Allen, Vice-President; Ralph K. Davis, Secretary. Copyright, 1953. Entered as second-class matter, Jan. 30, 1936, at the Chicago, Ill. post office under the act of Mar. 3, 1879. Additional entry at Long Prairie, Minn. ROCK PRODUCTS is indexed regularly by Engineering Index, Inc. and the Industrial Arts Index.

SUBSCRIPTION INFORMATION
Subscription Price: United States and Possessions, Canada one year, $2.00; two years, $3.00; three years, $4.00. Pan American, one year, $4.00; two years, $7.00; three years, $10.00. All other foreign one year, $6.00; two years, $11.00; three years, $15.00. Twenty-five cents for single copies. Canadian subscriptions and remittances may be sent in Canadian funds to ROCK PRODUCTS, P. O. Box 100, Terminal "A," Toronto, Canada.

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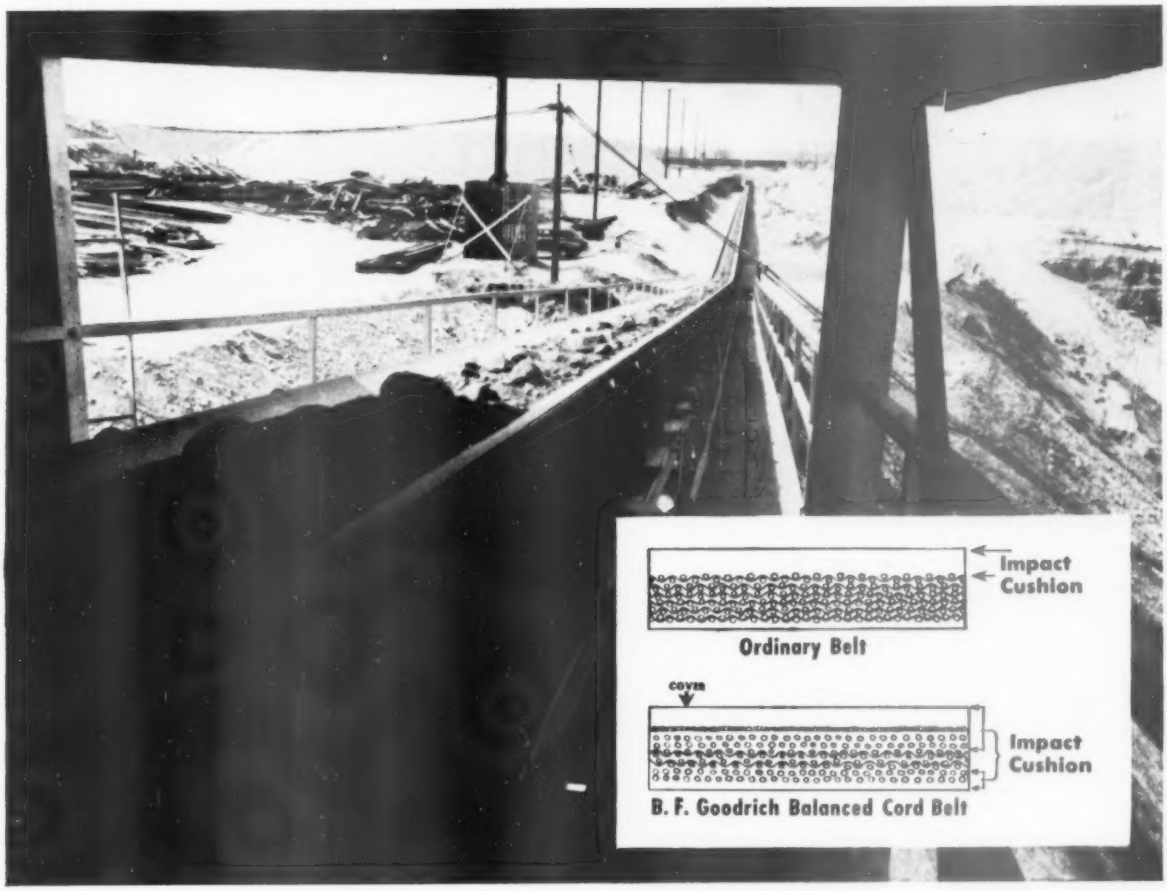
RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER



Where rocks ride a subway to cut conveying costs

B. F. Goodrich cord belt solves a rock-handling problem

THAT B. F. Goodrich cord belt carries rock from a quarry to a crusher a half mile away. It travels underground part of the way, under a public highway and two sets of railroad tracks, delivering 1,000 tons of rock an hour. It's been doing it for 3 years now, and is good for years more service.

Where you have long centers, or heavy impact, or high lifts, or perhaps a combination of the three, the belt for the job is the B. F. Goodrich cord conveyor belt. Here's why:

Cord belt stands more impact — Each lengthwise cord in a B. F. Goodrich cord belt is completely surrounded by rubber — no cross threads tie them together. Cords are free to "give" when impact occurs. Rubber distorts temporarily, distributing and absorbing a shock that would damage other belts. As an extra protection, B. F. Goodrich has added a patented *Transcord Breaker* — an extra layer of parallel cords in rubber, placed across belt width. Acts as a shock absorber, stretches to prevent gouges and cuts from splitting belt cover.

Cord belt troughs better — There being no crossweave in the cord plies, cords are free to flex. Belt conforms to idlers, pulleys. Spillage is reduced, troughing is natural and belt keeps centered on idlers, sustains less damage, requires less maintenance.

Cord belts for tough jobs — So whether it's heavy rock — or chunks of iron ore, coal, dirt, or gravel — B. F. Goodrich cord conveyor belts can do the job better and for less. Your local B. F. Goodrich distributor will show you how this belt can save you money. *The B. F. Goodrich Company, Industrial & General Products Division, Akron, Ohio.*

Conveyor Belts BY
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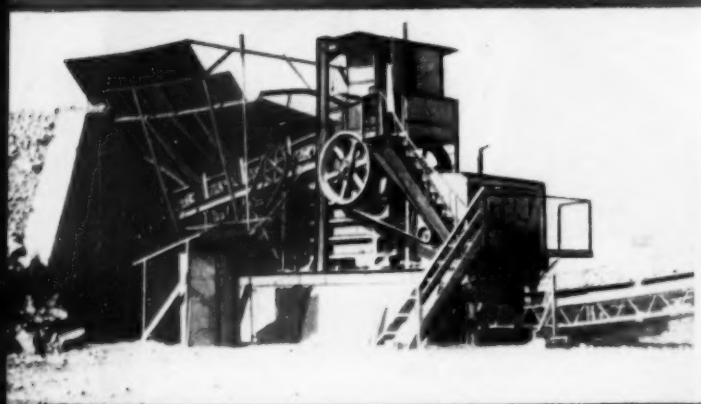
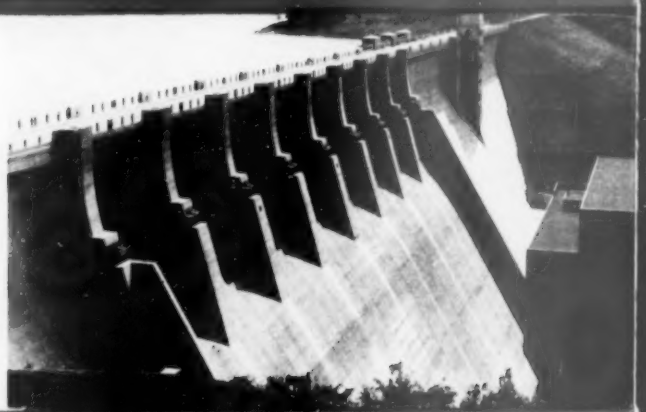
RUBBER FOR INDUSTRY

TELSMITH

800-900 tons per hour capacity quarry plant in Georgia

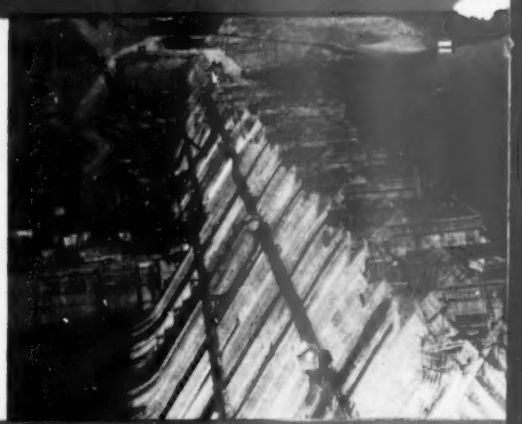


Telsmith helps build North African airports

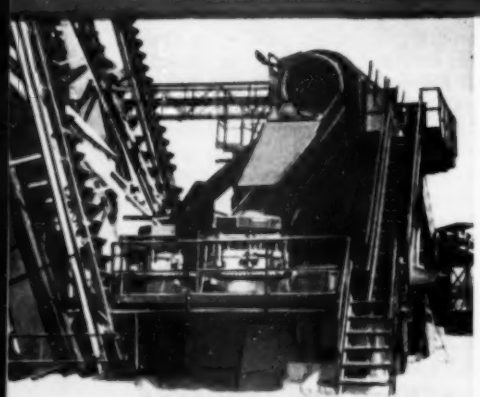


Aggregate plant built Center Hill Dam, Tennessee

200 tons per hour gravel plant in Wisconsin



2,500,000 tons aggregate for Norfork Dam, Ark.



Cedarvale rock crushing plant

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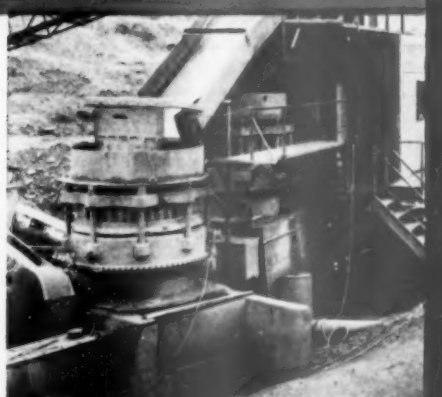
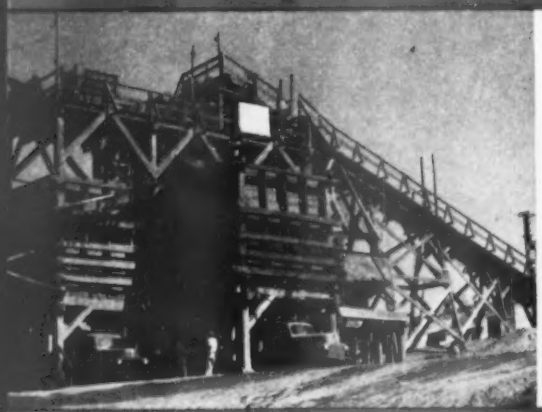


Crushing ore in Minnesota iron mine

Everywhere

1000-1200 tons per hour capacity sand and gravel plant, Long Island, New York



Aggregate plant for El Mirador Tunnel, Mexico

Combination quarry and gravel plant in Indiana

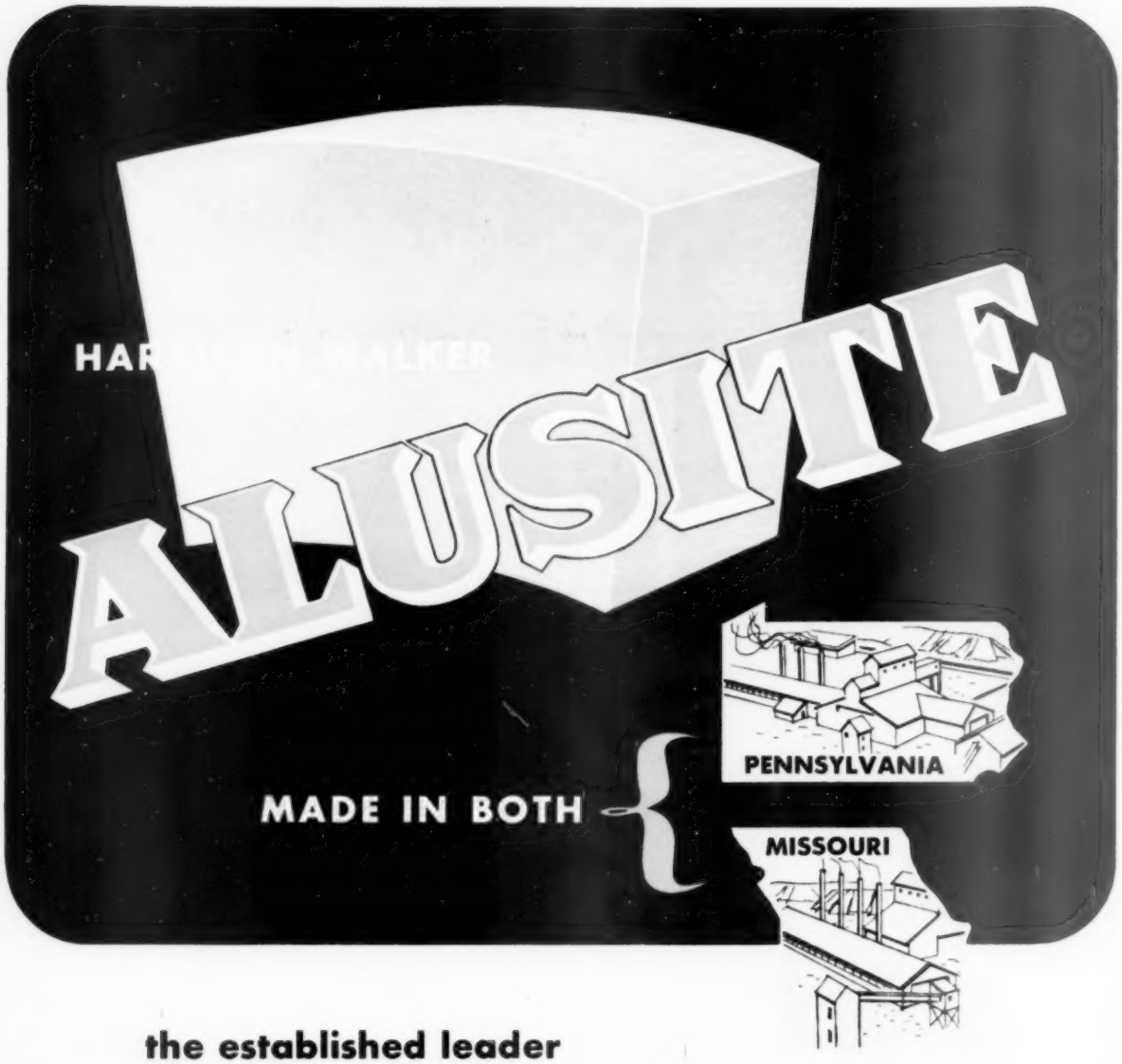
Lead mine in British Columbia, Canada

Telsmith helped build this Italian dam

Quarry plant at Warwickshire, England

Portable plant, building an airport in Alaska

M5-12



the established leader in the 70% alumina refractory class

The superior physical properties and chemical composition of ALUSITE long ago established its leadership in the 70% Alumina Refractory Class.

Outstanding service records made by ALUSITE in rotary kilns are attributable to its low porosity, high strength, volume stability and excellent spalling and flux resistance.

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Included in Harbison-Walker products are refractories for every rotary kiln plant requirement.

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WORLD'S LARGEST PRODUCER OF REFRACTORIES

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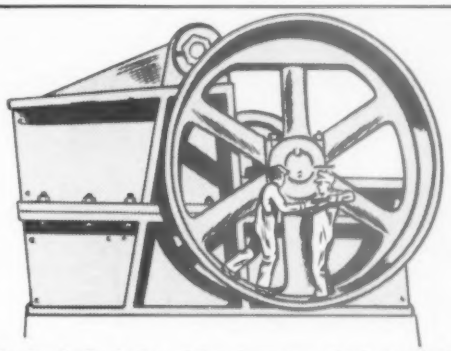
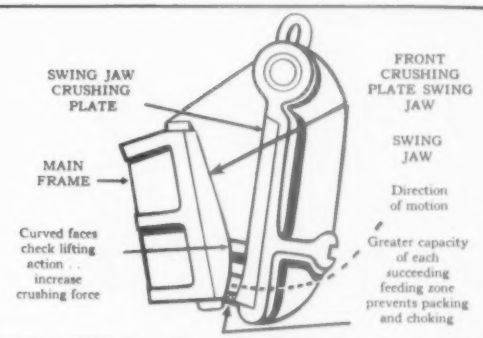


The Basalt Rock Co. of San Francisco, Calif., installed this 48" x 60" Traylor Jaw Crusher in 1945. Since then it has regularly crushed 1000 tons of Franciscan Sandstone per hour. On occasion, it has produced up to 1180 tons per hour.

Reduces Maintenance Costs: According to company spokesmen, the Traylor HB has not required any major maintenance at all since installation over seven years ago.


SWING JAW CRUSHING PLATE
FRONT CRUSHING PLATE SWING JAW
SWING JAW
MAIN FRAME
Direction of motion
Curved faces check lifting action . . increase crushing force
Greater capacity of each succeeding feeding zone prevents packing and choking

Produces With Less Power Per Ton: Curved Jaw Plates reduce choking and packing to keep horsepower per ton requirements low. This also reduces unnecessary wear . . . enables Traylor Curved Jaw Plates to outlast ordinary straight plate 3 to 1.

YOU DON'T GET production like this without reason: To see how a Traylor Crusher stands up under hard usage year after year, send for detailed illustrations and descriptions of Traylor construction. You'll find Traylor Type HB Jaw Crushers feature exclusive designs that boost production with a minimum of waste fines. Send coupon today.

SHOW ME how a Traylor Type HB Jaw Crusher will boost production . . . at less cost . . . for me. Send Bulletin 4105.

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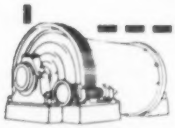
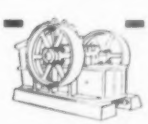

Ball Mills


Jaw Crushers

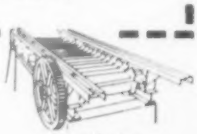
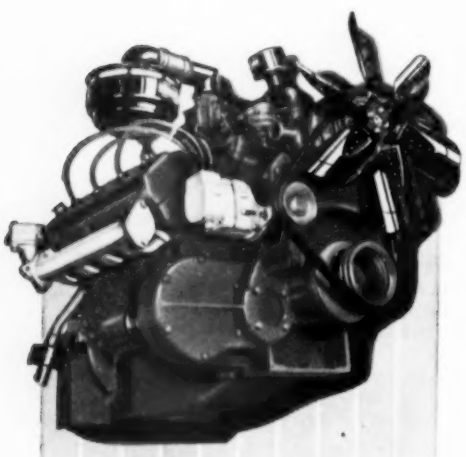

Apron Feeders

Photo courtesy Hobart Brothers Company, Troy, Ohio

Chrysler horsepower on the ground for added Safety in the Air . . .



The moment the big plane stops and the pilot cuts the engines, the generators, which in flight supply electrical power to the batteries, stop too. But the electrical equipment in the plane—air conditioning, lights, radio, food containers, everything electrical—continue operating off the plane's batteries. Only for a moment, however. In that length of time a self-propelled and self-powered energizer takes over and supplies all necessary current, even starting the plane's engines when it's time to leave.

Among the most popular mobile ground power units are the "Power-Pull" units manufactured by Hobart and powered by Chrysler. The unit pictured uses the mighty 180 horsepower Chrysler V-8 Industrial Engine and can furnish 1000 amperes, 28.5 volts of direct current under continuous operation—enough to handle the electrical load of the largest aircraft. Power from the same engine propels the unit, enabling it to serve also as a towing tractor.

This is another in the long list of important uses of Chrysler Industrial Power. Whether your equipment requires V-8 or Six cylinder engines, Chrysler can supply them with gasoline, propane or natural gas burning carburetor, 3, 4 or 5-speed transmission and other optional equipment.

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Installed on your conveyor, the RCA Metal Detector probes through rock to locate metals and alloys (including hard-to-detect manganese)—sounds an alarm or stops your conveyor—to keep trouble away from your crushers.

PAYS ITS WAY AGAIN AND AGAIN

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Company_____

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City_____ Zone____ State_____

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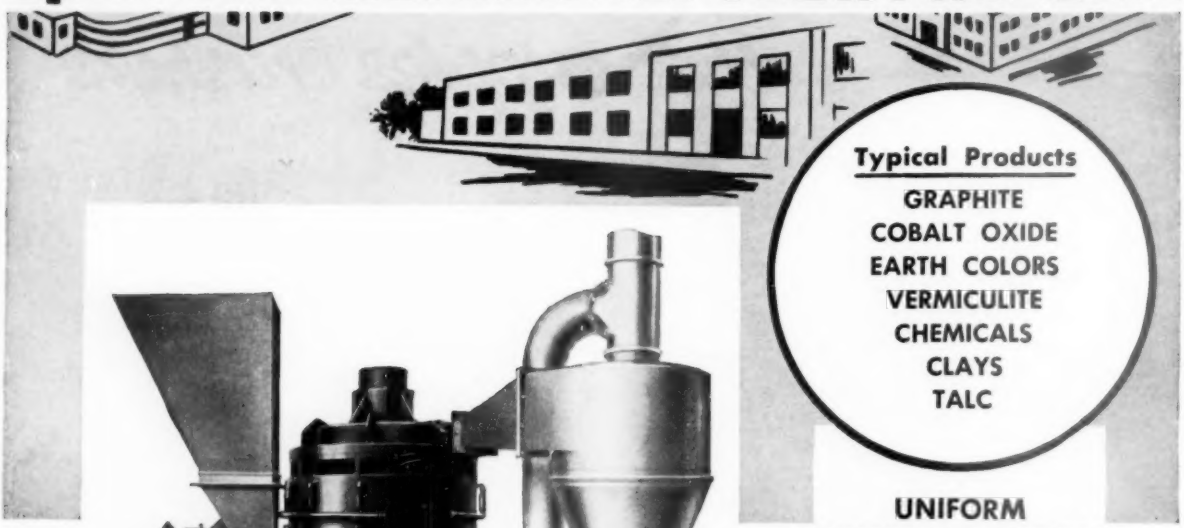

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The Vertical Mill makes possible improved qualities in many products such as finer and smoother texture, better processing properties and extreme fineness and uniformity of particle size. This mill is capable of going well beyond the fineness obtainable with ordinary mills.

On many materials, finenesses of 100% passing 325 mesh are available, and some products can be produced at finenesses of 95% to 99% passing 10 to 15 microns. Whizzer separation is effective in keeping over size from the finished product and insuring consistent uniformity.

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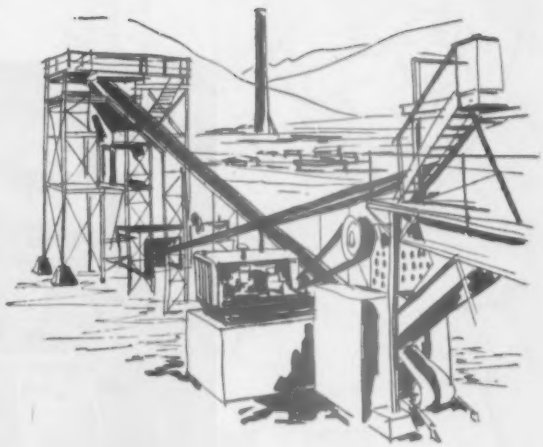
We've claimed that your Caterpillar Dealer backs them up with prompt, on-the-spot service.

We've claimed they will last longer—and do more work with less down time than any other unit.



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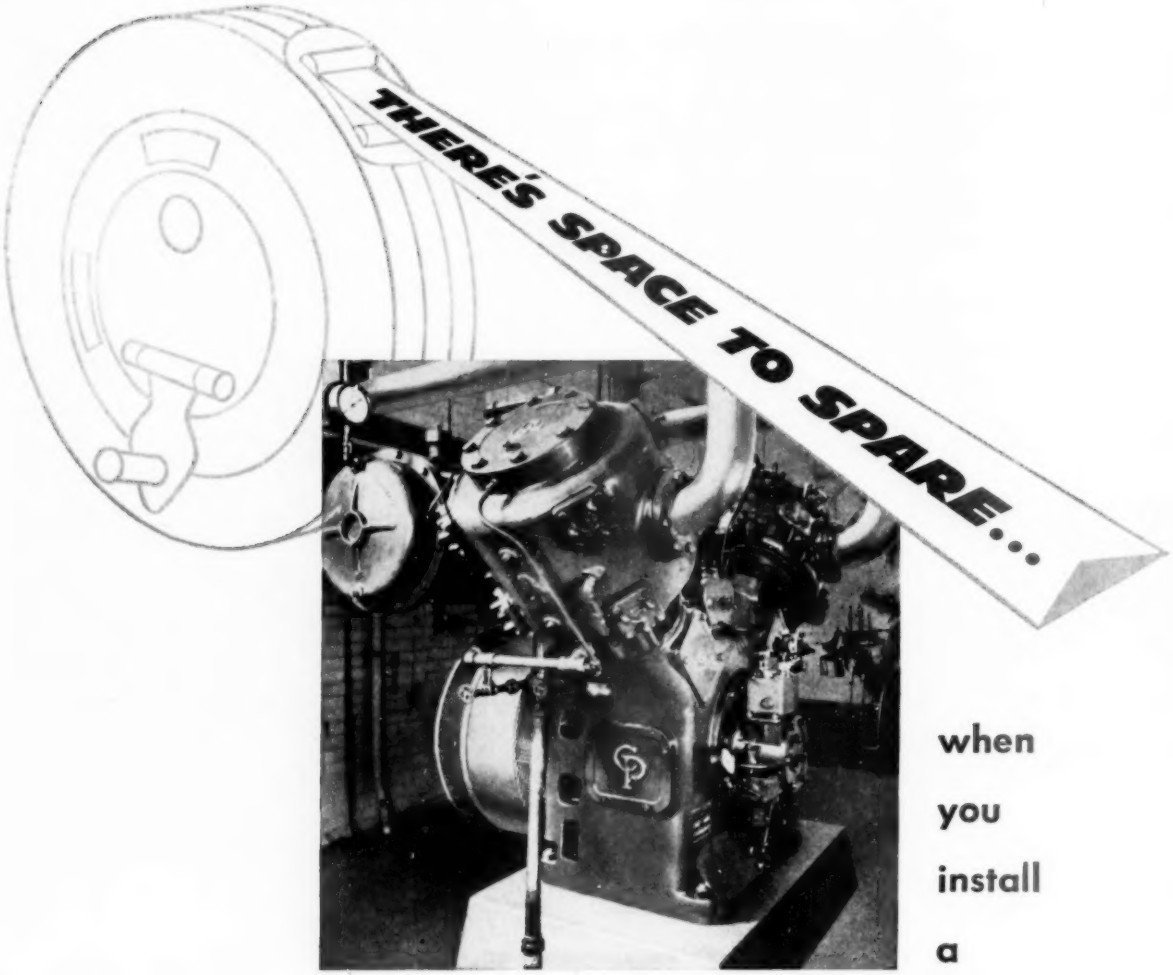

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Available in sizes from 75 hp to 250 hp, 410 cfm to 1663 cfm, and with flange mounted, belted and coupled motors. Write for Bulletin 766. *Chicago Pneumatic Tool Company, 8 East 44th Street, New York 17, N. Y.*

Chicago Pneumatic

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

ALLIS-CHALMERS

Grinding Mills

OVER HALF

of all Cement produced in the U.S. is Ground in Allis-Chalmers Grinding Mills!

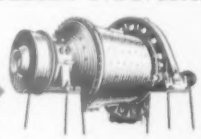
CEMENT PRODUCERS specify Allis-Chalmers grinding mills because they have proved so profitable on the job. In fact, 7 *out of 10* A-C mills sold today are repeat orders!

When you specify Allis-Chalmers grinding mills you profit by A-C's *unsurpassed* experience, engineering, testing, erection and parts service. You can be sure of getting the right size and type mill for your job. A-C has built over 4300 grinding mills covering every type of application.

Get more facts from the A-C representative in your area. And write Allis-Chalmers, Milwaukee 1, Wisconsin, for Grinding Mill Bulletin 07B6718A.

A-3996

ALLIS-CHALMERS



A-C builds single and multi-stage grinding mills in a complete range of sizes. Special mill modifications and grinding circuits can be engineered to suit your application.

Sales Offices in Principal Cities in the U. S. A. Distributors Throughout the World.

Vibrating Screens | Jaw Crushers | Gyratory Crushers | Hammermills | Kilns, Coolers, Dryers

HOW "CONSOLIDATION"

...with 2 rubber-tired Tournatractors

Within a 20-mile radius of their offices at Jenkins, Kentucky, Consolidation Coal Company, a division of Pittsburgh Consolidated Coal Company, operates 4 mines and 2 preparation plants. One of their 2 rubber-tired C Tournatractors handles all clean-up work at their "Beefhide" spread . . . the second "C" is on standby duty to handle emergency jobs at *all four* mines and the Jenkins Preparation Plant. This rubber-tired unit drives to the scattered job locations under its own power . . . travels over paved highways, limestone and red-dog surfaced mine roads, across tracks, up and down 20% grades at speeds up to 19 mph. It is ready to go *anywhere* at a moment's notice. No blocking, loading or unloading delays at any time! With high speeds on rubber, it puts spare time to work . . . drains refuse areas . . . strips overburden . . . hauls equipment on low-bed trailers . . . handles many other odd jobs.

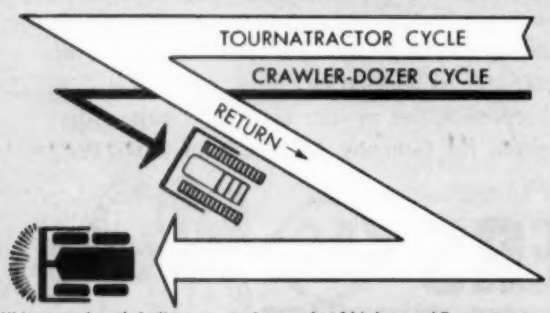
Saves 1" to 2" of coal on clean-up work

On clean-up assignments, Tournatractor's low-pressure tires reduce coal waste . . . don't dig coal into the ground or grind it into unrecoverable fines. At the "Beefhide" mine, for example, Consolidation's Tournatractor saves an estimated 1" to 2" of coal on its continuous cleaning operation.

Mobile Tournatractor gives "Consolidation" important *mechanical* advantages, too! 186 hp engine and 4-wheel drive put plenty of power behind the rugged 2½-yard blade. Instant-shift selection of 4 forward speeds saves vital momentum . . . lets operator drift loads in higher gears. Reverse speeds to 8 mph cut non-productive time on return half of cycle for more passes per hour. Big 21.00 x 25 low-pressure tires give plenty of sure-footed traction in soft material. Powerful 4-wheel, disc-type air brakes assure fast, safe control at all times.

Your LeTourneau-Westinghouse Distributor will be glad to show you the Tournatractor in action, so you can judge these advantages for yourself. Call him next time you're considering tractors.

High speeds, instant shift cut non-productive time



White travel path indicates complete cycle of high-speed Tournatractor. Black path shows fraction of cycle made in same time by crawler.

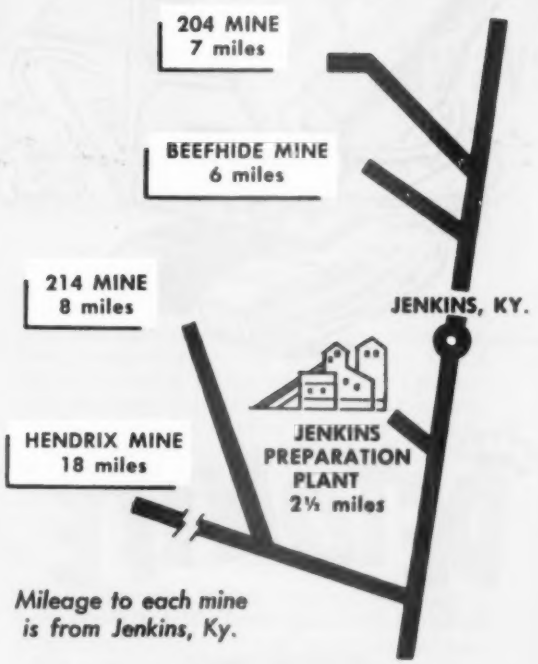
Tournatractor's instantaneous speed selection permits faster travel after blade is full . . . immediate reversal of direction for faster dozing cycles. Result — more jobs handled per shift.

Tournatractor—Trademark D-32 CM-w

LeTourneau-Westinghouse Company
PEORIA, ILLINOIS

HIGH-SPEED, RUBBER-TIRED EXCAVATING •

SERVICES 4 PITS...



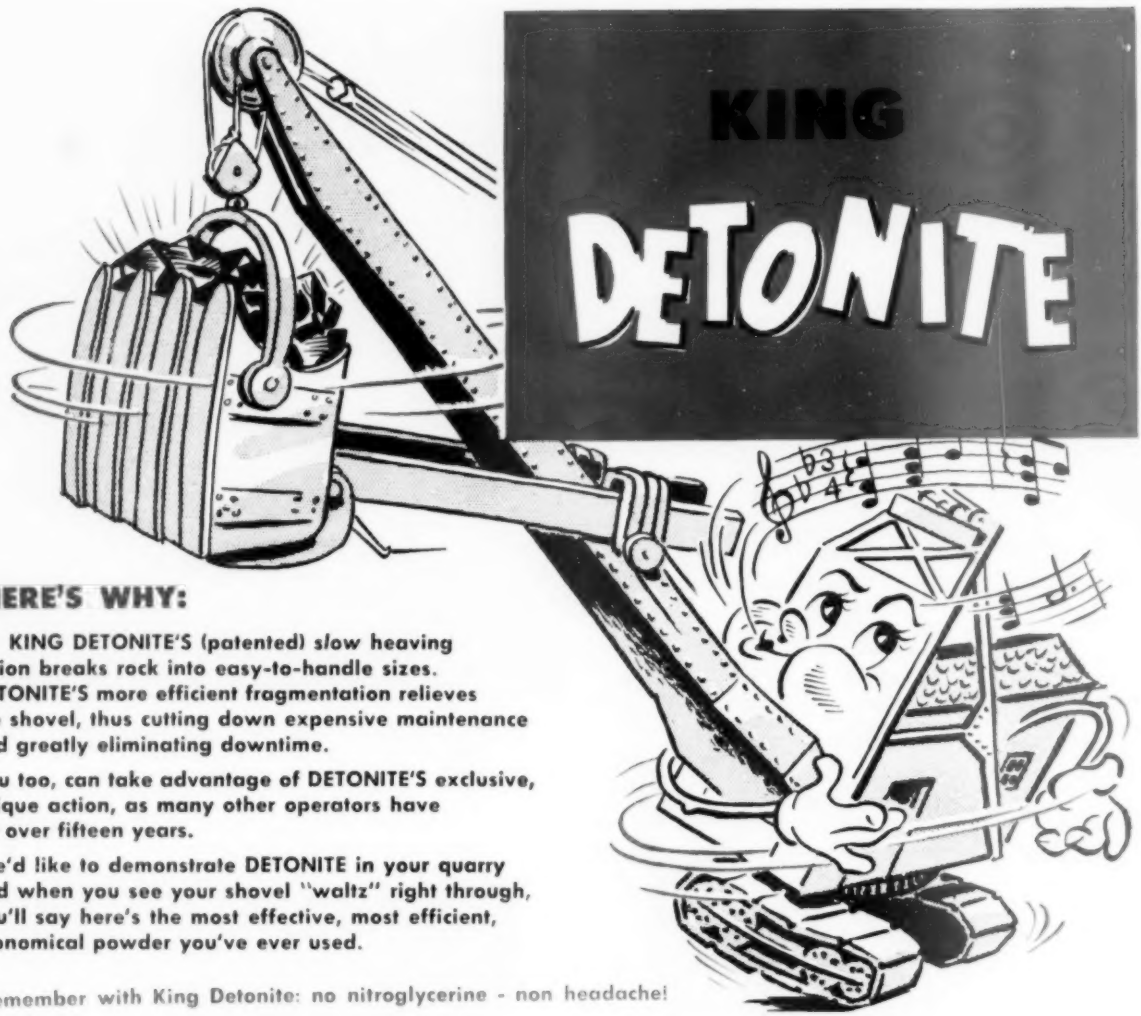
Mileage to each mine is from Jenkins, Ky.

At the Hendrix mine slate dump, Tournatractor pushes its load of truck-dumped slate 75' in 2nd gear (3.7 mph) . . . returns to dumping point in high reverse (8 mph).

Tournatractor works on loose spoil banks or hard-packed coal seams without damaging coal surface . . . completes dozing cycles in ½ to ⅓ the time required by crawler-tractors.

HAULING • LIFTING EQUIPMENT

shovels WALTZ when you use...



HERE'S WHY:

KING DETONITE'S (patented) *slow* heaving action breaks rock into easy-to-handle sizes. DETONITE'S more efficient fragmentation relieves the shovel, thus cutting down expensive maintenance and greatly eliminating downtime.

You too, can take advantage of DETONITE'S exclusive, unique action, as many other operators have for over fifteen years.

We'd like to demonstrate DETONITE in your quarry and when you see your shovel "waltz" right through, you'll say here's the most effective, most efficient, economical powder you've ever used.

Remember with King Detonite: no nitroglycerine - non headache!

4 WAYS TO CUT COSTS

King Powder Co., Inc.
Cincinnati 1, Ohio

SHOW ME how DETONITE will cut my costs 4 ways. Without obligation, have the King Representative get in touch with me to arrange for a DETONITE demonstration right at our quarry.

Name _____
Title _____
Company _____
Address _____

or phone us collect

DETONITE

PATENTED SURFACE-SENSITIZED EXPLOSIVE

1878 1953

THE KING POWDER CO., INC.
CINCINNATI 1, OHIO

"Our Dodge trucks are always ready for more work!"

Why new Dodge *"Job-Rated"* trucks help heavy haulers haul down bigger profits!

New stepped-up power!

New Dodge trucks move heavy loads onto and over the highway in jig time. Little wonder, too, with horsepower as high as 171 gross; PLUS higher-than-ever compression ratios. Optional twin carburetion and exhaust systems also gives ample power for hauling extra-heavy loads. And because they are *"Job-Rated"*, Dodge trucks are good for years of rugged toil . . . years of thrifty service.

Real rock-ribbed value

On top of regular Dodge extra values, imagine how these new features bolster your truck investment: reinforced cab construction, new "dual-primary"-type brakes that anchor tons of payload on steep inclines, increased engine cooling capacities. It won't cost a dime to drop in and chat with your friendly Dodge dealer. Have him explain how Dodge *"Job-Rated"* trucks fit into your hauling picture.

. . . says **Glenn M. Sayers,** *General Foreman, Whiteside County Highway Dept., Morrison, Illinois*

"Our Dodge trucks do a nice job for us.

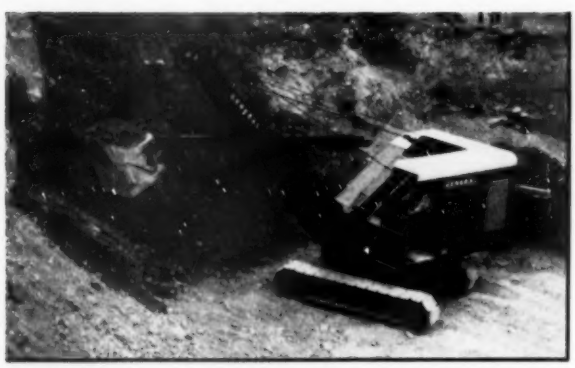
"We have four 2½-ton dumps and use them regularly for all sorts of rugged work. They haul road gravel, limestone, black top matter, quarry rock . . . and they plow snow as well!

"We are well satisfied with the good, dependable performance of Dodge. Our drivers also tell us that the dependability of Dodge is tops.

"Our Dodge trucks are always ready for more work!"

DODGE
"Job-Rated" TRUCKS

FOR ROAD BUILDING...BATCH PLANT...DITCH, TRENCH OR BORROW PIT...GENERALS ARE BUILT FOR EXTRA LONG LIFE



***CONVERTIBLE** . . . GENERALS are designed for in-the-field conversion from Crane, Clamshell or Dragline, to Shovel or Hoe. **COMBINATION** Machine Purchases . . . save money . . . save time . . . for long range, variable-job programs. **A TORQUE CONVERTER** pays for itself quickly through increased production . . . reduces maintenance cost . . . up to 25%.*

5313

The *first* GENERAL machine that rolled off the production line is still "going strong" near Delaware, Ohio . . . a durable veteran of 25 years. Today the same basic quality of long, dependable service is being built into the precision-engineered GENERAL Model 320. Public Works engineers, construction men, industrial buyers know . . .a Long Lasting GENERAL is a Sound Investment . . . that goes on working efficiently for years after it has paid for itself.

LONG LIFE . . . one-piece cast-steel deck for rigid machine assembly and anti-friction bearings, help insure durability, reduce costly downtime.

CAPACITY . . . Model 320 is a full ¾ cu. yd. machine with a big engine for economical operation.

BALANCE . . . Long crawlers . . . wide frame . . . location of deck machinery . . . hook rollers, all combine to give extra stability for maximum lift.

OSGOOD O-G GENERAL

MARION, OHIO

OVER 100 YEARS OF ENGINEERING PROGRESS

His wagon is hitched to a star...the DW10

The Russian River Gravel Co., Santa Rosa, Calif., hauls gravel and sand from a river to its plant—a half-mile round trip. To write its balance sheet in *black ink*, the haul has to be made quickly, economically and with big pay loads. That's why the job was given to a Caterpillar DW10 Tractor and W10 Wagon.

"I can operate my DW10 cheaper than I can my dump truck," explains Walter J. Doyle, owner. "To do the same amount of work would require two 5-yard dump trucks. Another thing, the DW10 handles nicely on loose material."

On the job, the DW10 is hauling more than 40 yards an hour. Gravel is sold for road work, sand for building.

The Cat* W10 Wagon is designed to help you haul fast. It hauls 8.9 yards struck, 14 yards heaped—and Mr. Doyle gets an average load of 10 yards. Its generous bowl provides an ample bull's-eye for shovel or dragline loading.

Dumping is speeded with a hydraulic ram which puts the operation under complete control of the operator. He can open the doors to any position whether the wagon is moving or stationary.

Let your dealer demonstrate these all-Caterpillar-built units. Designed as a team, tractor and wagon will give you the quickest, most dependable and productive hauling possible.

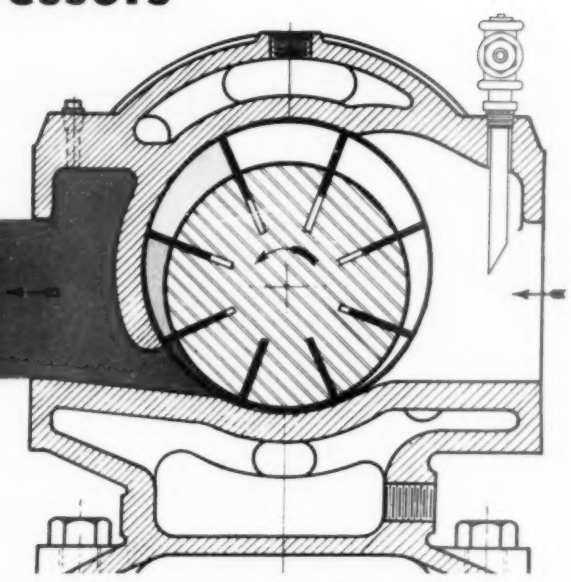
Caterpillar Tractor Co., Peoria, Illinois.

CATERPILLAR*

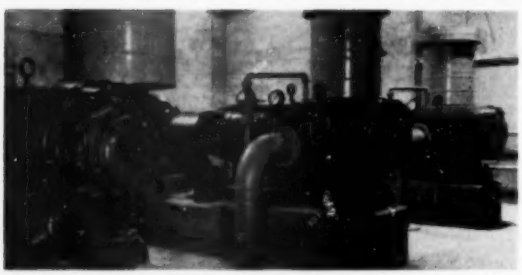
*Both Cat and Caterpillar are registered trademarks—(R)

**NAME THE DATE...
YOUR DEALER
WILL DEMONSTRATE**

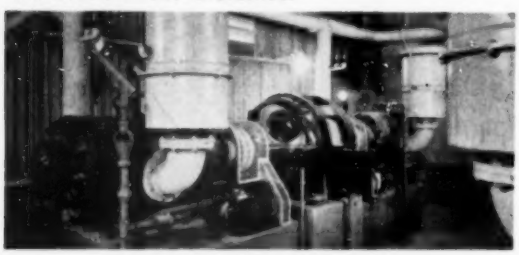
Fuller Rotary Compressors put the SQUEEZE on compression costs



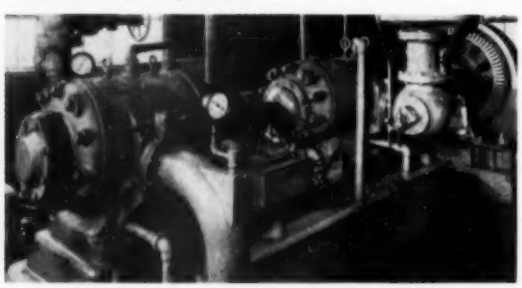
...for pressures up to 125 lb.



Three Fuller Rotary Single-stage Compressors. Capacity each 1400 c.f.m., 19-lb. pressure.



Fuller Rotary Single-stage Duplex Compressor. Capacity 2010 c.f.m., 35-lb. pressure.



Fuller Rotary Two-stage Compressor. Capacity 1665 c.f.m., 100-lb. pressure.

When you consider all the many uses you have for compressed air, you should give careful thought to the best way to get compression with dependability, plus minimum cost and attention—selection of the proper compressor at the required pressures to do the work in the most efficient manner. Fuller builds the compressor that has *earned* a reputation for dependability and long life—for pressures up to 125 psig.

Fuller Rotaries have so many inherent advantages that they warrant your closest examination. Free from reciprocating parts, with no valves to leak or seats to grind, no unbalanced forces to set up vibration, they assure low-cost, smooth-flow operation during their long life. And, they give you *original, maintained capacity*.

Check your compressed-air needs . . . a Fuller engineer, specializing in compressed-air engineering, will give you the *right* recommendation to enable you to produce air efficiently, and at the lowest possible cost. Write now.

FULLER COMPANY, Catasauqua, Pa.

Branch Offices

Chicago • San Francisco • Los Angeles • Seattle • Birmingham

Fuller

C-237
2157

Pioneers of high-efficiency vane-type rotary compressors

LOADING — High reverse speeds, power steering and high lift make the Model HM flexible and fast for loading operations with output between 100 and 150 cu. yds. per hour.

STRIPPING — The ability of the Model HM to dig and load enables it to strip overburden and load it too when advisable. Precise bucket control also insures a close, clean stripping job.

FEEDING — In many pits it is more economical and practical to feed conveyors with "PAYLOADERS." The ability of the "PAYLOADER" to feed material selectively is often a valuable asset.

PULLING & PUSHING — The 90 horsepower engine and 4-wheel drive provides lots of drawbar horsepower for pushing, pulling and equipment-shifting work.

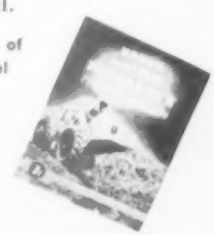
MASTER OF MANY JOBS

The big Model HM "PAYLOADER" tractor-shovel is popular at pits, quarries, mines and plants because it is both capable *and* versatile . . . is able to do many jobs and move quickly from place to place at speeds of 17 m.p.h. Big tires, plus 4-wheel drive, gives it catlike traction over rock, dirt and sand. Power-boosted rear wheel steering makes it maneuverable and easy to handle . . . 4 gear ratios in each direction provide the right speeds to fit each task.

The powerful 1½ cu. yd. "PAYLOADER" is the flagship of the "PAYLOADER" fleet, which includes 7 sizes down to 12 cu. ft. bucket capacity.

Also a choice of 4 wheel drive, rear wheel drive and front wheel drive to best fit your needs. Your Hough Distributor, one of 200 in the U.S. and Canada, is ready to serve you *right* — with extensive application experience and complete parts and service facilities. The Frank G. Hough Co., 705 Sunnyside Ave., Libertyville, Ill.

WRITE for full information on any of the "PAYLOADER" models: Four Wheel Drive HM — 1½ yd. and HR — 1 yd.; Rear Wheel Drive Models HY — 1¼ yd., HF — ¾ yd., HE — ½ yd.; Front wheel drive Models HAH — 15 cu. ft., HA — 12 cu. ft.



SAY "HUFF"

PAYLOADER®

THE FRANK G. HOUGH CO. SINCE 1920

WHITE 3000 Fleet Speeds Spreading . . . Cuts Hauling Costs

REPORT FROM SPOKANE—Lower hauling costs, faster work with the White 3000!

And it's the same story from coast to coast!

Tailored right to the job, the White 3000 design adds new efficiency and economy throughout the construction industry . . . like this fleet of White 3026's owned by Curtis Gravel Co., Spokane, hauling and spreading materials for highway surfacing.

Find out how many ways White Trucks can cut *your* costs . . . speed *your* work. See your White Representative today.

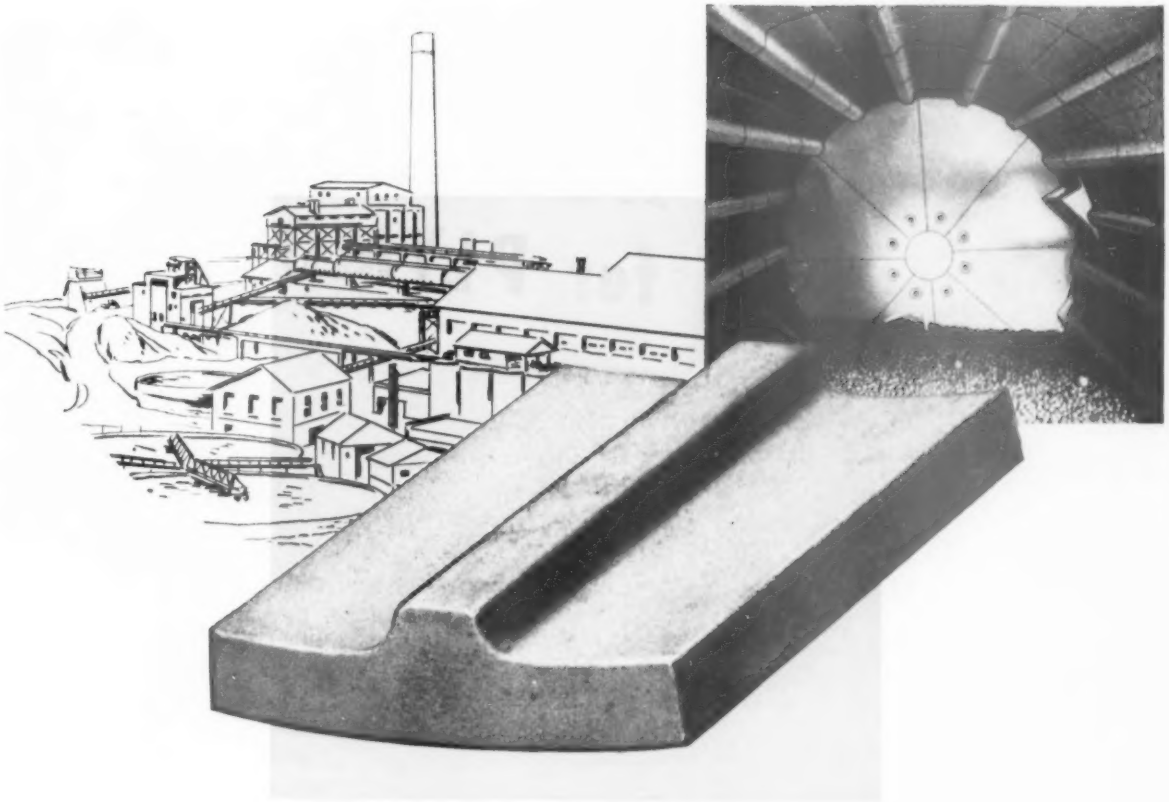
30 MINUTES FOR 13-MILE, 13-TON LOAD

Curtis Gravel Co. boosted payload within legal limits from 10 to 13 tons when this fleet of Whites went into service. These bottom dump spreaders are on continuous service from loading at the hopper to spreading station—30 minutes a round trip. High maneuverability and plenty of Mustang power save time on tight schedules.

White

THE WHITE MOTOR COMPANY • Cleveland 1, Ohio

For More Than 50 Years The Greatest Name In Trucks



this LINER boosted production 35%

AMSCO Ball Mill Liners

Reduced Down-Time, Increased Production...

A large West Coast cement producer found that Ball Mill Liners were causing expensive trouble. Liners were thick—*over 3 inches*. This meant reduction in mill capacity. Thick liners also meant tremendous weight. Both thickness and weight reduced production and efficiency. *Liners wore rapidly*, too, causing frequent, expensive replacement jobs, with costly labor and material. And added to the bill was lost production due to mill down-time.

Well-known for their skill in handling impact and abrasion-resistant alloys, AMSCO engineers and foundrymen were consulted.

AMSCO solved the Ball Mill Liner problem.

AMSCO designed a new, light, thin—*1 inch thick*—liner, which because of lightness and thinness increased mill capacity, heightened efficiency. The new liners lasted beyond all expectations and in addition the segments were easier to install. These factors, plus reduced replacement down-time, have been responsible for a *35% increase in production*.

AMSCO is the largest producer of Manganese Steel, "the toughest steel known," which has proven itself under countless abrasion and impact situations. And where the service conditions require it, AMSCO also produces Chromium-Molybdenum and Chrome-Manganese alloys.

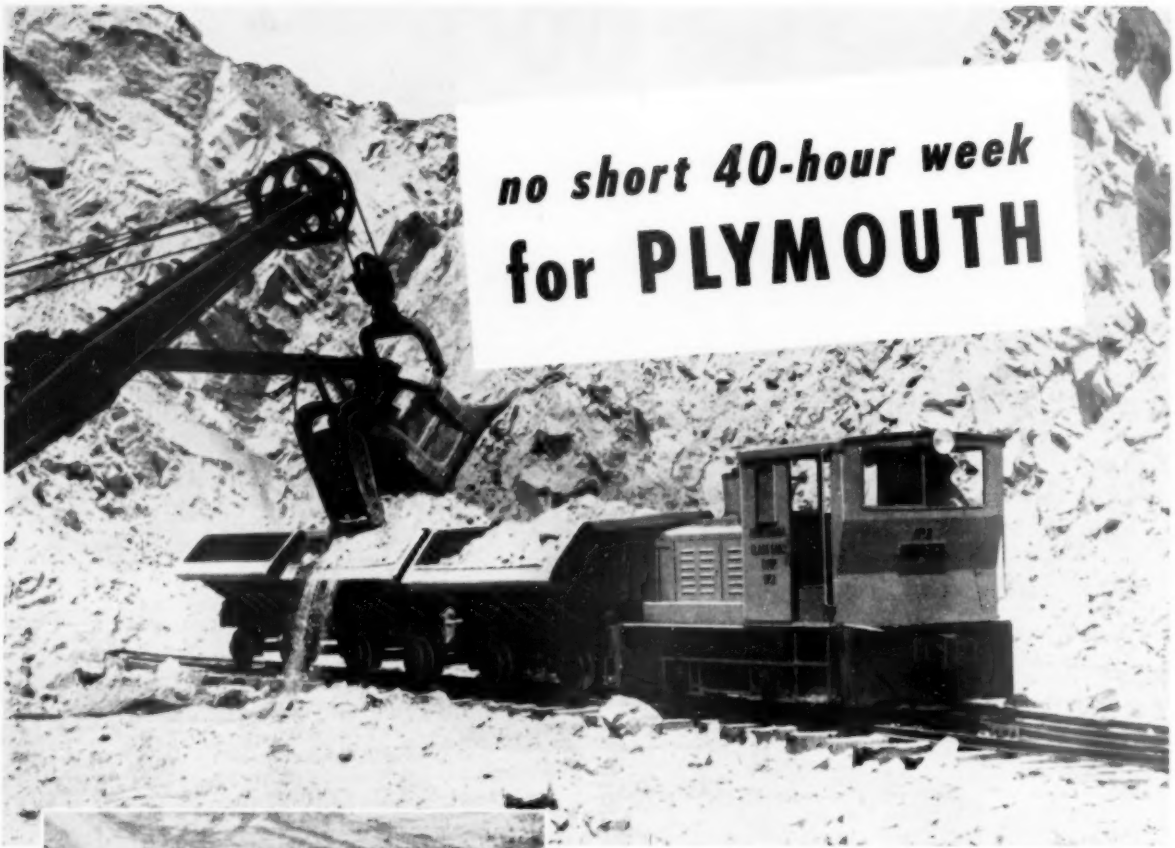
If you have a tough wear problem and suspect that there may be a better alloy for your purpose, you are invited to write to AMSCO for further information.

AMERICAN Brake Shoe COMPANY

AMERICAN MANGANESE STEEL DIVISION

377 EAST 14th STREET • CHICAGO HEIGHTS, ILL.

Other Plants: New Castle, Del., Denver, Oakland, Cal., Los Angeles, St. Louis. In Canada: Joliette Steel Division, Joliette, Que.
Amsco Welding Products distributed in Canada by Canadian Liquid Air Co., Ltd.



no short 40-hour week for PLYMOUTH

One of 5 Plymouth Locomotives hauling Quartzite for the Pennsylvania Glass Sand Corporation at Hancock, West Virginia.

Rugged Plymouth Locomotives haul Quartzite Rock 144 Hours per week

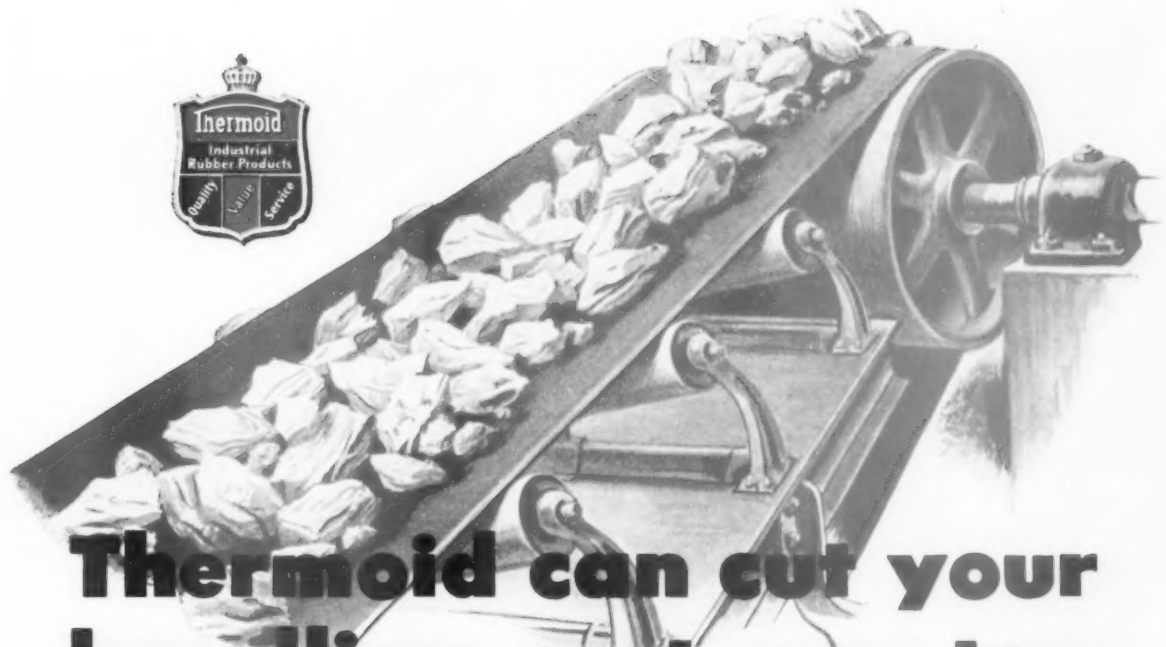
Hauling Quartzite is no soft touch—and that's where Plymouth Locomotives pay off. Plymouths have performed so well that The Pennsylvania Glass Sand Corporation now operates five of them in their vast Hancock quarry. The 10-ton Diesel with Torqomotive drive in the big picture runs 24 hours a day, 6 days a week. Fuel consumption averages about 5 gallons per 8 hour shift. The other Plymouths operate with the same economy. In addition the smoothness of Torqomotive Drive and ease of handling keep the operators fresh and efficient over the full shift.

Plymouth Locomotives will give the same exceptional performance for you. Write today for full information to Plymouth Locomotive Works, Division of The Fate-Root-Heath Company, Dept. A-5, Plymouth, Ohio.

PLYMOUTH® LOCOMOTIVES

WITH TORQOMOTIVE DRIVE

ALSO MANUFACTURERS OF F-R-H CERAMIC MACHINERY



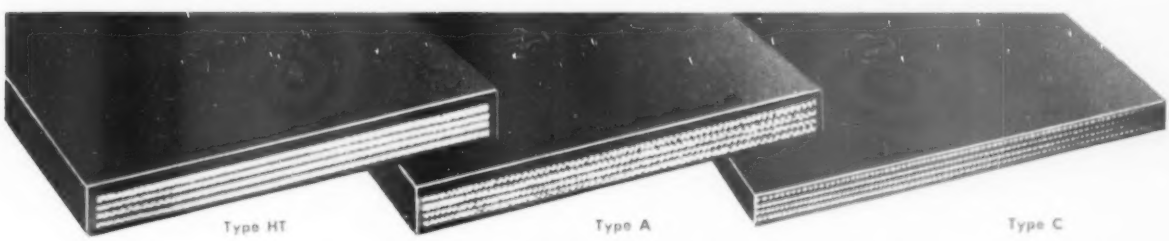
Thermoid can cut your handling cost per ton

Regardless of the weight, abrasive action or temperature of the materials you handle, there's a Thermoid Conveyor Belt that will stay on the job longer, reducing your handling cost per ton.

Thermoid Conveyor Belting for mining, quarrying or heavy construction work is designed for maximum service in these specific uses. Strong cotton fabrics, thoroughly impregnated with high test rubber friction, are combined with tough, wear-resistant rubber covers. Welded together under extremely high pressures to assure exceptionally strong, durable belting.

Your Thermoid Distributor can help you select the belt best suited to your needs. If your problem is unusual, he'll call an experienced Thermoid Sales Engineer.

Thermoid Belting specifically designed for mine, quarry and construction work:



For highly abrasive granite, flint rock, quartz ore, etc.

For slag, lime rock, crushed stone and hot material.

For sand, gravel, loam and finished cement.

Write for Thermoid Conveyor Belting Catalog #3679, containing full engineering data.

Conveyor & Elevator Belting • Transmission Belting
F.H.P. & Multiple V-Belts • Wrapped & Molded Hose

Thermoid

Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah

AUSTIN-WESTERN'S *Experience* can cut your crushing costs

"61" 1024 jaw crusher (1020 or 1016 optional)
"101" 1036 jaw crusher 3018 roll crusher
"201" 1024 jaw crusher 2416 roll crusher
"111" 1036 jaw crusher 4024 roll crusher

Because of over 65 years of skilled engineering and sound manufacturing experience, Austin-Western can be counted on for the newest, most efficient equipment for every crushing job.

These portable plants are typical of how Austin-Western equipment can produce more for you for less money. Liberal use of alloy heat treated steel, anti-friction bearings and oversize parts assure you of uninterrupted service, big output and maximum operating efficiency.

For complete information about Austin-Western crushing, screening and washing equipment consult your A-W Distributor or write **Baldwin-Lima-Hamilton Corporation, Construction Equipment Division, Lima, Ohio.**

There are Austin-Western crushing plants for any requirement you might have . . . small portable units with single crusher and screen, multiple portable units, or stationary crushing and washing plants. We have just the plant to fit your requirements.

Austin-Western
CRUSHING, SCREENING and WASHING EQUIPMENT

BALDWIN BLH LIMA-HAMILTON
Construction Equipment Division

BALDWIN-LIMA-HAMILTON CORPORATION
Construction Equipment Division
LIMA, OHIO, U.S.A.

CUT DOWNTIME... 2 WAYS...

with

VICTOR

HARD-FACING ALLOYS

1

FASTER APPLICATION

Smooth-flowing VICTORTUBE goes on faster, cuts parts rebuilding time, thus gets your equipment back to work quicker.

2

TRIPLES SERVICE LIFE

where severe abrasion is encountered, parts rebuilt with VICTORTUBE outwear the original three to five times — *your equipment stays on the job longer* . . . and you reduce parts inventory.

Owner Ed Blood rebuilding teeth on 28" bucket auger with VICTORTUBE "Special" at Berkeley Bit Service, Berkeley, California. VICTORALLOY used on bucket wear pads (left).

Prolong Parts Life NOW with These VICTOR Hard-facing Alloys

THIS HARDFACING ROD	FOR THESE CONDITIONS	FOR SUCH EQUIPMENT
VICTORALLOY	Abrasion and severe impact	Tractor rollers, dredge pump impellers, bucket lips and teeth, rock crushers, steel mill wobblers
VICTORTUBE	Severe abrasion	Scarifier teeth, dredge cutter blades, posthole augers, oil field tools, ditcher teeth
VICTORITE	Earth abrasion or sliding friction	Plowshares, cultivators, steel mill guides, cement chutes, shaft bearings, rolling mill guides
VICTORITE 1	Corrosion, heat and abrasion	Saw-teeth, carbon scrapers, wire guides, rocker arms
VICTORITE 6	Red heat, impact, corrosion and abrasion	Blanking, forming and trimming dies; cams, hot punches, pump shafts
VICTOR TUNGSMOOTH	Thin cutting edges	Coal cutter bits, brick augers, pug mill knives, screw conveyors

Available in a full range of sizes for both acetylene and electric AC and DC applications, either hand or automatic. Order a supply from your VICTOR dealer today . . . look for this sign.

Dealer Inquiries Invited!

H2

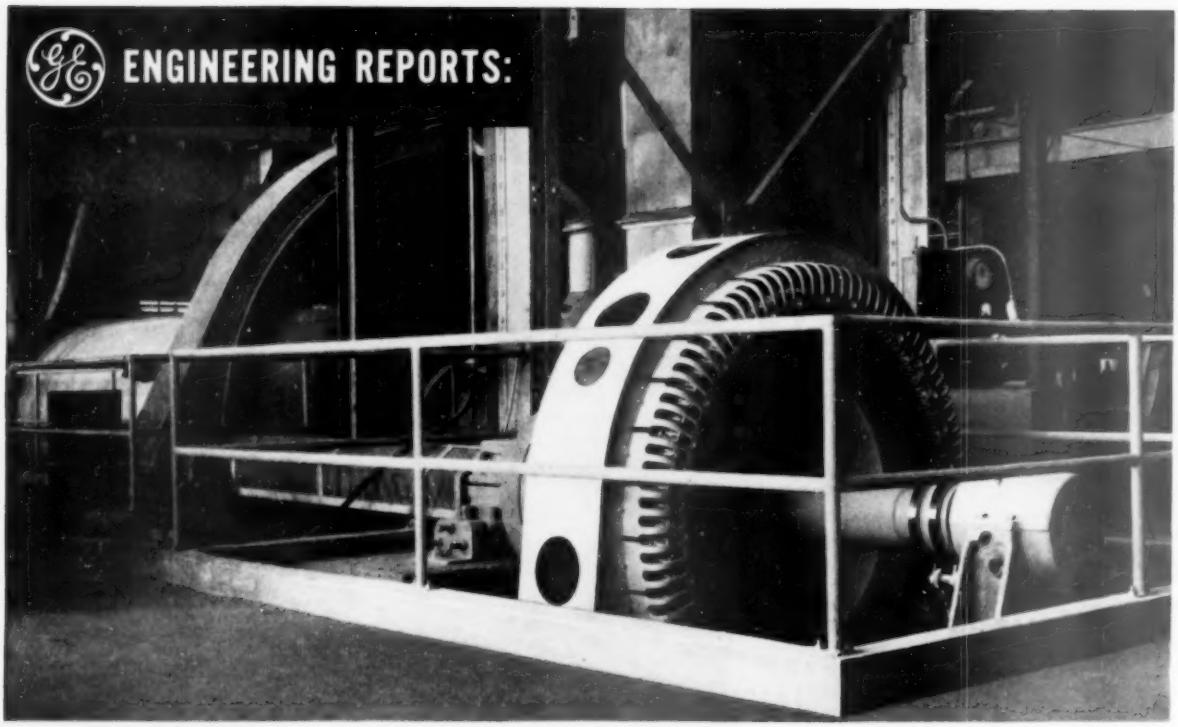
VICTOR for welding

VICTOR EQUIPMENT COMPANY

3821 Santa Fe Ave.
LOS ANGELES 58

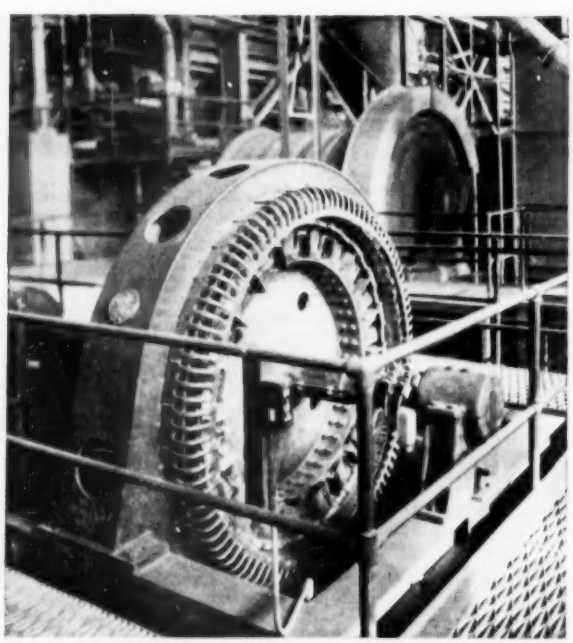
844 Folsom Street
SAN FRANCISCO 7

1312 W. Lake St.
CHICAGO 7

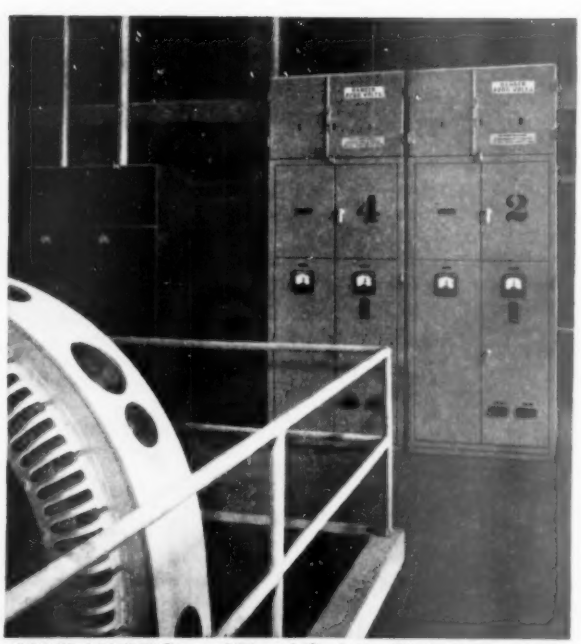


HIGH OPERATING EFFICIENCY is inherent in G-E low-speed high-voltage synchronous motor drives for large pulverizers. In a California cement plant, eight of these General Electric synchronous motors are used to drive the finishing mills.

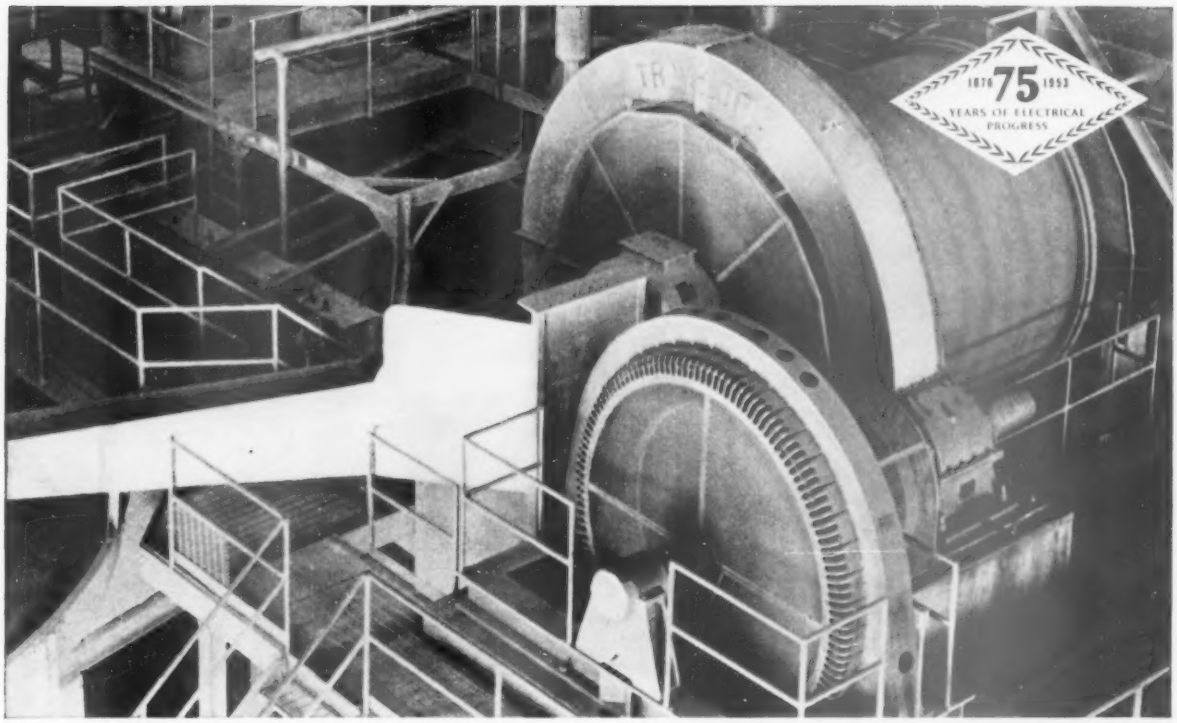
High-voltage drives for large



LESS MAINTENANCE is needed when fewer and larger mills are driven by high-voltage synchronous motors. An example is this G-E 500-hp, 2300-volt unit driving a ball mill.



SPACE-SAVING General Electric limitamp high-voltage motor control panels for synchronous motors provide adequate short circuit protection with high-IC current-limiting fuses.



IMPROVED POWER FACTOR that cuts plant power bills is another advantage of General Electric synchronous motors.

This 500-hp, 180-rpm, 4160-volt unit in a Colorado cement plant drives a primary wet ball mill that is used in raw grinding.

pulverizers boost cement output

G-E APPLICATION ENGINEERS, experienced in cement plant problems, plan and integrate electrical systems to meet your plant's specific needs.

As part of an electrical modernization plan, they also reduce maintenance, cut plant power distribution costs

One way to cut unit costs per barrel of cement today is through greater continuity of production—using large, high-output pulverizers driven by efficient, high-voltage 2300- or 4160-volt motors and control. Many cement plants, for example, have found it pays to replace several small units with a single large mill driven by a General Electric high-voltage synchronous motor with limitamp control. Maintenance is less, output higher. Moreover, with power distributed at high voltage, power losses and first costs are cut.

Money-saving, production-boosting drives like these are used by General Electric engineers when they plan and integrate an electrical system to meet *your* cement plant's particular needs. Find out how they can help you modernize electrically today to increase your cement output tomorrow. G-E engineers can also show you how you can modernize step by step to keep today's production going. Contact your nearest G-E Apparatus Sales office and ask for Bulletin GEA-5469, or write to General Electric Company, Section 658-10, Schenectady 5, New York.

Engineered Electrical Systems for the Rock Products Industry

GENERAL ELECTRIC

CHEVROLET ADVANCE-DESIGN TRUCKS

More work per dollar . . . and here are 4 powerful reasons why!

MORE POWER AT LOWER COST! Watch costs go down when you put the new heavy-duty power of Chevrolet's advanced Loadmaster engine to work! The new high-compression ratio of 7.1 to 1 in this great engine brings you more power and even greater economy than before. Chevrolet's Thriftmaster engine, too, in light- and medium-duty models offers exceptional economy of operation.

FACTORY-MATCHED TO THE JOB! Some jobs demand more power. Some demand stronger springs. But, *whatever* the requirements of your job, Chevrolet trucks are carefully *factory-matched* to the work to be done, with the *right* power—and the *right* units from tires to axle, springs to clutch—to handle that work at lowest cost.

MORE RUGGED THAN EVER! There is extra economy, too, in the exceptional stamina of Chevrolet trucks. You can expect new ruggedness and strength with heavier, more rigid frames and brawnier construction throughout. You can expect extra miles added to the life of your truck, plus a substantial reduction in the over-all cost of hauling.

LOWEST PRICED LINE! Chevrolet trucks are known for qualities and features matched by no other trucks. Yet, with all these advantages, the Chevrolet line lists for less than any other trucks of comparable size and specifications. See your Chevrolet dealer. Chevrolet Division of General Motors, Detroit 2, Michigan.

CHEVROLET ADVANCE-DESIGN TRUCK FEATURES

TWO GREAT VALVE-IN-HEAD ENGINES—the Loadmaster or the Thriftmaster—to give you greater power per gallon, lower cost per load. **POWER-JET CARBURETOR**—for smooth, quick acceleration response. **DIAPHRAGM SPRING CLUTCH**—for easy-action engagement. **SYNCHRO-MESH TRANSMISSION**—for fast, smooth shifting. **HYPOID REAR AXLE**—for dependability and long life. **TORQUE-ACTION BRAKES**—on light-duty and medium-duty models and on front of heavy-duty models. **TWIN-ACTION REAR BRAKES**—on heavy-duty models. **DUAL-SHOE PARKING BRAKE**—for greater holding ability on heavy-duty models. **CAB SEAT**—with double deck springs for complete riding comfort. **VENTIPANES**—for improved cab ventilation. **WIDE-BASE WHEELS**—for increased tire mileage. **BALL-GEAR STEERING**—for easier handling. **UNIT-DESIGNED BODIES**—for greater load protection. **ADVANCE-DESIGN STYLING**—for increased comfort and modern appearance.

CHEVROLET

first in demand in value in sales

TOUGH TEST for a scraper

Stripping dry, very hard clay overburden is a severe test of a scraper. When it can haul 1,000 yards in an eight-hour day with a 2,400-foot round trip, it has passed the test with flying colors. That's the record of this Caterpillar No. 80 Scraper and D8 Tractor, stripping overburden from red firebrick clay near Ione, Calif. They are owned by John Pedro of Stockton.

Mr. Pedro has standardized on Caterpillar equipment, with five D8 Tractors, three No. 80 Scrapers, a Motor Grader, Ripper and two stationary Cat* Diesel Engines. "I've owned Caterpillar equipment for about 18 years," he says. "I'm always able to get parts and service, and have had very little down time. If I were to buy more machines tomorrow, I'd make them Caterpillar-built units."

Mr. Pedro reports that his No. 80 Scraper is push-loaded full of hard clay in about 45 seconds, and unloads in about 10! The burly No. 80 hauls a heaped load of 20 yards. Being cable operated, it loads smoothly, and can pump "dead" material. And it unloads quickly and evenly with positive, fast-responding ejection.

Like all Cat equipment, the No. 80 is built to stay on the job and out of the repair shop. Good design, rugged construction and high tensile steels give it the ability to earn its keep for years to come.

Your Caterpillar Dealer will gladly demonstrate, *on the job*, the Cat Scraper that fits *your* needs. He stands back of the machine he sells with factory-supervised service and a big parts stock. Call him today.

Caterpillar Tractor Co., Peoria, Illinois.

CATERPILLAR

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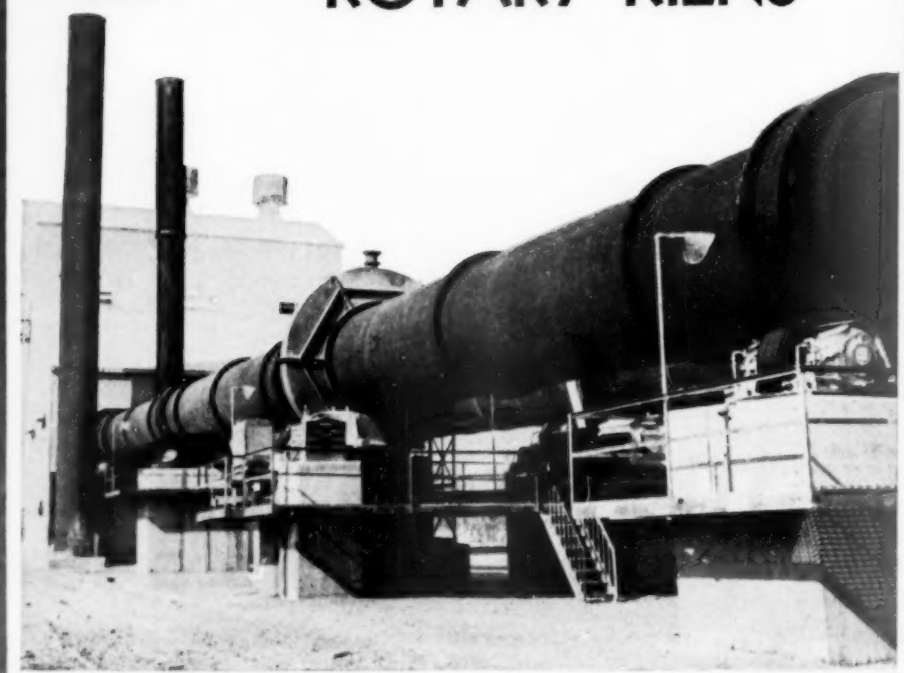
NAME THE DATE... YOUR DEALER WILL DEMONSTRATE

SMIDTH

ROTARY KILNS



Smidth machinery has been supplied to over 70 countries of the world including 1000 rotary kilns and 5000 grinding mills, plus auxiliary machines such as coolers, agitators, washmills, pumps, conveyors, packers, separators, etc. for use in Cement, Lime and Ore plants.

For Smidth Machinery apply to:

F. L. Smidth & Co., A/S Vestergade 33, Copenhagen K, Denmark	**F. L. Smidth & Co.** 11 West 42nd Street New York 36, N. Y.	**F. L. Smidth & Co., Ltd.,** 105, Piccadilly, London, W. 1, England
F. L. Smidth & Cie France 80 Rue Taitbout Paris (9e) France	**F. L. Smidth & Co. of Canada, Ltd.** 11 West 42nd Street New York 36, N. Y.	**F. L. Smidth & Co. (Bombay) Ltd.** 42 Queen's Road Bombay, India

"WE HEAR..."

July, 1953

Construction contract awards in the 37 states east of the Rockies for the first five months of 1953 totaled $6,792,329,000, an all-time high and 8 percent over the previous record year of 1952, according to an F. W. Dodge Corp. report. Non-residential building showed the greatest gain, increasing 16 percent over the five-month, 1952, figure, to a total of $2,492,801,000. Residential awards of $2,795,412,000 were up 1 percent, while heavy engineering (public works and utilities) awards of $1,504,116,000, showed an 11 percent gain. Total awards for the month of May amounted to $1,606,091,000, which was an 8 percent decrease from April, but 3 percent higher than in May, 1952.

* * * * * * * * * *

Gravel pits along the Santa Cruz River in Arizona, once declared a menace to the safety of children, have now been filled in by the operators. Heavy earth-moving equipment was used in breaking down the steep banks and the pits were filled to a point above the water level. The owners, who had been requested by local government to fence in the pits, went them one better by completely removing the menace. As stated by the owners, fencing the pits was impractical because children crawl over, under and through fences.

* * * * * * * * * *

A new product, composed chiefly of a liquid synthetic rubber and a dry cement base, reportedly may revolutionize the construction industry. Developed by the Engineering Experiment Station of Georgia Tech, the product, as claimed, will make concrete last indefinitely. The material is said to adhere readily to steel, glass, wood, stone or concrete. It is also claimed that it will stand up under heavy vibration or impact, will take colors and polishing for ornamental floors or walls, and will preserve the structural steel in fireproof structures. Over 500 laboratory experiments were recorded in the development of the substance.

* * * * * * * * * *

Preliminary findings of a study of accidents on the 327-mile Pennsylvania Turnpike system has revealed that high speed is not the main cause of traffic accidents, although 85 percent of them can be traced to driver error. The peak of accidents was found to occur at speeds between 41 and 59 m.p.h. Only 15 percent of the accidents were found to be due to mechanical malfunction, blow-outs and unlooked-for road obstacles. The study is being conducted by the Pennsylvania Turnpike Commission for the Pennsylvania State Legislature Joint Committee investigating safe-guards and safety regulations on the turnpike system.

* * * * * * * * * *

Uranium exploration in the Florida counties of Hillsborough and Polk is currently being conducted by the Atomic Energy Commission. The purpose of the drilling program is to find out why the uranium, which is known to exist in the phosphate field, is present. About 100 test drillings, each averaging about 100 ft. in depth, will be made. Cores from the drillings will be studied by the U.S. Geological Survey.

* * * * * * * * * *

A new and economical method of applying gypsum to the soil to counteract alkaline conditions is being employed by farmers in the Lower Valley area of West Texas. The method consists of dumping rock gypsum into irrigation water where it is dissolved and carried to the fields during irrigation, a procedure which is recommended by the University of Arizona School of Agriculture. One farmer, who has been using gypsum for the past three years to correct the alkaline condition of his soil, reportedly has increased the growth of cotton plants by approximately 200 percent, with a 25 percent increase in actual cotton production.

WE HEAR

New York State has taken positive action in the prevention of children drowning in sand, gravel and other excavations. A bill recently passed by the legislature and signed by the governor includes the following measures: (1) That owners be required to cover or fence in open wells, pits, cesspools, cisterns, catch basins or sumps (violation of the measure would entail a $500 fine and a year in jail); (2) that Nassau county and the towns of Chenango and Union in Broome county be given the power to have hazardous excavations either filled by the owner or the town at the owner's expense; and (3) that all Erie county towns be empowered to fill excavated lands if the owner fails to do so after a hearing and receiving a notice. Demands for such legislation were made after several recent drownings in unprotected excavations.

* * * * * * * * * * *

Wage increases pushed construction costs up in June after eight months of relative stability, the longest such period since 1949, as reported by Engineering News-Record. Wage increases reported for several cities more than offset lumber price declines in six cities, boosting the construction cost index 0.7 percent to a new all-time high of 593.35 (based on 1913 equaling 100). The building cost index (also a 1913 base) was 426.65 in June, which was practically the same as for May. The pattern of wage-rate increases so far in 1953 is reported as being 10 to 15 cents per hr., including fringe benefits, which is at a lower rate than the average 1952 wage increase.

* * * * * * * * * * *

Quarries and nonmetal mines in the United States used 167,454,926 lb. of industrial explosives in 1952, according to the Bureau of Mines. This was an increase of 10 percent over the quantity consumed in 1951. Of the large quarry and nonmetal mining states, Iowa, Missouri, Illinois and Ohio reported increased consumption, while Pennsylvania and Michigan reported decreases. Quarries and nonmetal mines consumed 22 percent of the industrial explosives sold in the United States in 1952.

* * * * * * * * * * *

In a local account of how phosphate lands had made some Bartow, Fla., citizens wealthy, it was revealed that one individual had contracted with one of the phosphate mining companies to provide wood to be used as a fuel for drying rock. As it so happened, the property purchased by the enterprising citizen from which he planned to get the wood, turned out to have vast quantities of high-grade phosphate rock under it.

* * * * * * * * * * *

Heavy construction awards, nationally, totaled $7,487,287,000 for the first 25 weeks of 1953, as reported by Engineering News-Record. This was a 17 percent increase over construction awards of $6,417,597,000 reported for the corresponding 1952 period, and a 7 percent gain over the 1951 total.

* * * * * * * * * * *

A new product, "Emeri-crete," a form of crushed emery stone which, when mixed with concrete, is said to make a "slip-proof" flooring for industrial plants, is being produced at a new $1,000,000 plant in Peekskill, N.Y. The plant, owned by the New York Central Railroad company, is operated by Cortland Stone Corp., which has leased the property. The emery deposit supplying the Peekskill plant is located about three miles northeast of the plant and is reportedly the only emery deposit being worked in the western hemisphere.

* * * * * * * * * * *

In spite of the advancement in safety education and training, tragic accidents due to lack of safety precautions are still occurring. One such accident recently reported at a western rock products plant resulted in the death of an employe who was killed instantly when he was caught in a pulley belt. The employe apparently was oiling the equipment or making a machinery adjustment without first stopping the operation.

* * * * * * * * * * *

Severance taxes on mining operations continue to be under consideration. According to recent reports, a bill is being considered in the Florida state legislature which proposes a 50-cents-per-ton severance tax on rock phosphate produced in the state. Another proposed Florida bill would impose a 15-mill tax on each dollar value of mineral leases, which would be over and above taxes on the land itself.

THE EDITORS

Barber-Greene

HEAVY-DUTY LONG-REACH 150 TO 425 TONS/HR. PORTABLE CONVEYOR

MODEL 374

ONE MAN

high-capacity loading, unloading, stockpiling of all bulk materials

Here is a pneumatic-tired portable conveyor with capacities from 150 to over 425 tons per hour. The B-G 374 can be towed from job to job, pile to pile, and has all the flexibility in use of smaller portable conveyors. It is built for heaviest service, yet one man can operate it to load, stockpile and unload far more tonnage per day than with any other truly portable conveyor. The 374 will handle sand, stone, wet concrete, coal—any bulk material—at a cost so low that every aggregate producer, contractor, City, County or State Highway Department handling large quantities of materials, should get the full details now on this new heavy-duty machine.

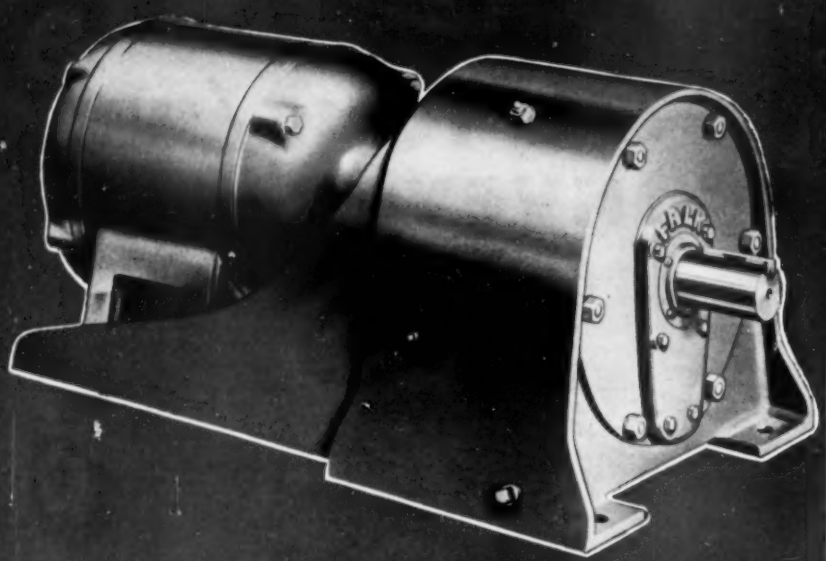
see your **B-G distributor** ...or write

Barber-Greene Company, Aurora, Illinois, U. S. A.

Choose the All-Motor type,

ALL-STEEL **FALK** Motoreducer

...with complete foot-mounted motor of ANY make ANY type ANY speed



Its exclusive, superior features mean LONG-RANGE ECONOMY!

You get more for your money in a FALK all-steel, All-Motor type Motoreducer. Here is the *only* compact motorized reducer with a separate foot-mounted, resilient Steelflex coupling-connected, standard motor without modifications! It accommodates *any* make, type, or speed of motor within the AGMA rating of the unit. Ratio can be changed within torque capacity of unit without modifying motor.

The simplified construction of the FALK All-Motor type Motoreducer means real long-range economy. Motors or reducer units can be quickly and easily interchanged from one line or plant location to another. Fully standard replacement motors from manufacturers' field stocks are always available without costly delivery delays or special motor or shaft modifications.

When you choose a FALK All-Motor type Motoreducer, you get the utmost in design, versatility of performance, and utility—plus the greatest possible dollar-for-dollar value throughout its traditionally long life... Available in any standard ratio from factory and distributor stocks throughout the country. Write for Bulletin 3104.

FALK ...a good name in industry

THE FALK CORPORATION 3001 W. Canal St. Milwaukee 8, Wis.

Every FALK motoreducer has these "IN-BUILT" FACTORS

1 **All-steel Housings.** Unbreakable, strong, rigid. Generous overhung load capacities provided by wide bearing spans, large shafts and bearings.

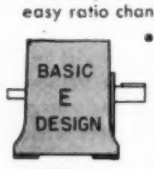
2 **Streamlined inside and outside.** Smooth, clean surfaces; machine welded construction conforms to NEMA motor frames.

3 **Sealed Housings.** Dual closures and one-way vents keep oil *in*, dust and moisture *out*. Units are splashproof, leakproof, dustproof.

4 **Positive Lubrication.** Large sump capacity ...oil-tight construction assures clean lubricant...direct dip of revolving elements provides positive lubrication at all speeds.

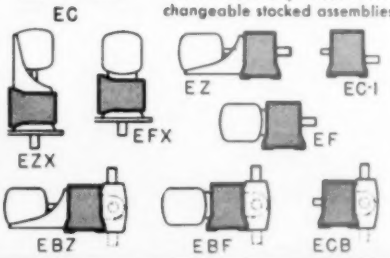
5 **Wide Speed Range.** Selective ratio combinations provide output speeds from 1.5 rpm to 1430 rpm with stock gears.

6 **Precision Gearing.** Heat-treated alloy steel, precision cut and shaved helical gearing throughout...quiet-operating crown shaved pinions...taper bored gears for easy ratio changes.



EC

The basic E design permits maximum use of standardized parts . . . closer control over materials, processing, inspection and assembly . . . resulting in faster delivery from interchangeable stocked assemblies.



WRITE FOR BULLETIN 3104

Agricultural Limestone and the Government Farm Program

PRODUCERS in the limestone and lime industries have expressed mixed reactions, as to the effects of all the publicity that has been attached to the National Agricultural Limestone Association's fight in Washington to defeat Secretary of Agriculture Benson's proposal to cut and drastically change the Agricultural Conservation Program.

Apprehensive producers within the association and without believe that recent articles and editorials in newspapers coast to coast blasting the association and its executive secretary for their vigorous stand will react adversely to the industry.

Many others look at it differently. They take the view that the pressure brought to bear in opposition to Secretary Benson has served to educate congressmen in the merits of soil fertility and to make them aware of the importance of agricultural limestone to the farm economy.

The Subsidy

The effort was successful. An increase in the A.C.P. appropriation for the 1954 crop year was voted through by the Senate Appropriations Committee, raising the fund to 195 million dollars. Secretary Benson had sought a cut to 140 million dollars. He wanted to limit the use of most of the funds for so-called permanent practices.

The committee also expressed its intent to adhere to the policy of having soil conservation practices continue to be instituted by the State committees.

We are not defending subsidies herein because we know that any industry which depends to a great extent on subsidies for much of its income is unsound. Farmers, like any other segment of our economy, should pay the entire cost of any business expense which is needed and will return profits through increased yields.

However, the "bad" publicity which has alarmed some producers hasn't been entirely fair and it certainly has not been unbiased. Some of it has fallen short of telling the whole story, not necessarily by intent, but it has nevertheless left wrong impressions.

The disclosure which set off the chain reaction in the press was a "confidential" letter from its executive secretary to members of the National Agricultural Limestone Institute, which inadvertently fell into hands of Representative John Taber of New York who is chairman of the House Appropriations Committee.

This letter, under date of April 20, commented on A.C.P. Memorandum 5 which set forth in writing the policy of the Benson administration. The real trouble maker was a sentence in that letter which read "Briefly it (Memorandum 5) puts an end to our National A.C.P. Limestone Program. From now on you would be on your own to sell your product. Limestone could be used in a few cases, but in my opinion the total purchased would not exceed two million tons and probably would only be half this amount. You would have to market the other 26 or 27 million tons without any financial assistance."

That paragraph was presented before the House Committee by Representative Taber as proof that the limestone industry is depending on government payments to market its product to farmers.

What was said in that industry letter, to give emphasis to the meaning of the proposed appropriations cut, could very well have been stated differently and there might not have been so much press criticism. If it could have been foreseen that the letter might fall into hostile hands, undoubtedly the letter would have brought out the urgent need for more educational work and the association accelerating its already rapidly expanding program for direct merchandising to the farmer.

Association's Contributions

We have been attending meetings of this organization from the beginning and have noted each year that great progress has been made in the development of a program of promotion patterned along sound business lines. It encompasses advertising in all its forms; direct mail, meetings, demonstrations, schools, educational programs, cooperative efforts with county committees and the Grassland program and many other activities to sell the farmer not only on the need for liming but to encourage sound overall farming practice.

If the state agronomists and other farm experts are right—and who can dispute their test data and figures?—when they tell the needs for liming, fertilizers and other practices to conserve our soils —we know that the industry association is performing a valuable service for the nation with the limited funds it receives as dues. It isn't just a limestone lobby or a "trust" as some newspapers would lead their readers to believe. There are members in the organization who do not want subsidies, but others do feel that the **low competitive price** for agstone justifies subsidies to get the job of soil conservation done.

A story partially told has led to unfair criticism.

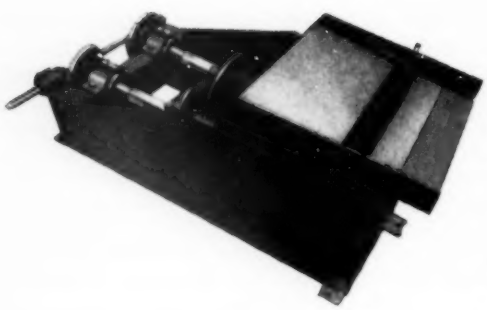
Bror Nordberg

OKey! SO YOU HAVE A SPECIAL AGGREGATE WASHING PROBLEM

So, your material is dirtier or stickier than usual—contaminated with mud, trash, shale, lignite, peat or what have you? Don't be discouraged—EAGLE equipment has "cleaned up" many a deposit that was thought to be commercially impractical. Besides standard fine material washer-classifier-dehydrators and coarse material washer-dewaterers, Eagle builds many special units to meet specific conditions. Eagle is "way ahead" in experience, range of equipment, practical design.

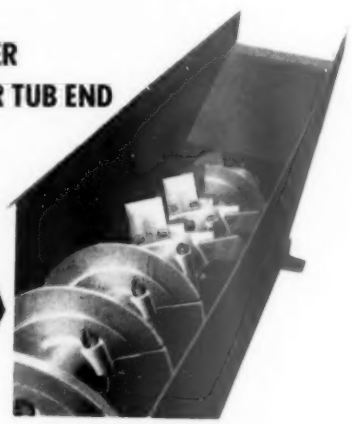
THERE'S AN EAGLE MATERIAL WASHER FOR EVERY NEED!

EAGLE SPECIAL WASHER-DEWATERER with perforated screw flights and section of paddles for more effective removal of lignite, mud and trash from material. A secondary stage of washing and dewatering is sometimes advisable.



WASHER-DEWATERER WITH TRASH REMOVER TUB END

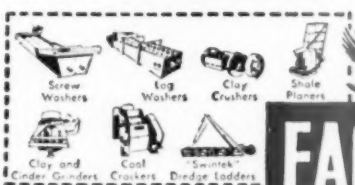
Handles removal of chips, coal, vegetation and other foreign material more easily floated than shale. Instead of standard flotation method, extraneous material is rolled up inclined discharge spout.



EAGLE SHALE REMOVER

For removal of shale and similar material. Coarse material is fed uniformly onto inclined plane, in a thin layer. End of tub is sealed off, increasing velocity of rising column of water in tub, which is forced through opening formed by two hinged baffle plates. Material passing over opening is freed of shale which washes out, aggregate going to the bottom. The screw further washes and scours the material, then drains and discharges it.

Eagle Special Washing Equipment is described in Catalog 47.



EAGLE IRON WORKS

LEADERS IN AGGREGATE WASHING AND CLASSIFYING EQUIPMENT FOR HALF A CENTURY

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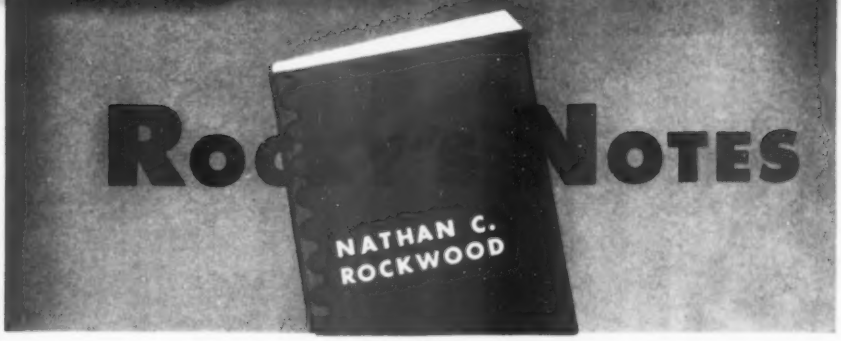


Something to Learn from Clay Research

NEXT TO LIMESTONE probably clay has played the most important role in development of habitations for civilized peoples and other constructions of mankind. Clay was perhaps the first natural building material to be manipulated, and clay-plastered twigg latticed framework was the common method of construction for ordinary home dwellings many years before the Roman Empire. Along about the same period, rammed-earth or clay walls (pisé or adobe) were used for more permanent houses, and eventually sun-dried clay brick or block. It was the rammed earth between wood forms type of construction that suggested monolithic concrete structures, many years later. Ever since Roman Empire days, and probably long before, artisans knew the qualities of clay desired for such practical purposes, which of course, included the making of household utensils. And that is as far as knowledge of clays went until about the last few decades in our own times.

In these last few decades clays have been intensively studied by geologists, geochemists, petrologists, mineralogists, agronomists and colloid scientists to determine their characteristics, origins and physical-chemical properties. Meanwhile, of course, the fields of usefulness for clay and clay minerals have been widely extended, particularly as catalysts in the chemical industries associated with petroleum processing. In this short time the total amount of *profitable* research done on clays very likely exceeds that done on portland cement during its entire history; and this research was also done with the object of developing special products, or products having special characteristics for designed purposes. During the same period much so-called portland cement research appears to have been chiefly concerned in finding flaws in the material, and attempts to correct them by methods of construction or with materials other than cement. It should be added that during this recent period of clay research many new tools and facilities have been developed to aid such research, which were not all available or employed in cement research.

Resembles Cement Paste

Off-hand, the cement or concrete researcher would be apt to say he can learn nothing from work done with clays—from a commercial angle usually considered only as a competitive product. However, if he can be induced to give the matter a second thought—and a little investigation—he may find much to be learned. Among these things are the various laboratory technics employed, the colloidal character of clays, which closely resembles that of cement paste, the kind of natural processes that lead to formation of, and changes in, clays, which are much the same as those that cause the hardening and the disintegration of cement paste and concrete, and probably many other items for those already imitated in the study of geochemistry and colloid science. Moreover, it should not be overlooked that clay or shale is one of the two chief raw materials for portland cement manufacture—and that there is vastly more to clay chemistry than laboratory analysis for Al_2O_3, SiO_2, etc.

There have been several symposia on clay and clay minerals. The latest of these to come to our attention was that held under the auspices of the American Institute of Mining and Metallurgical Engineers, in St. Louis, Mo., February 19-22, 1951. The proceedings have recently been published in book form under the title "Problems of Clay and Laterite Genesis".* As would be expected, the text is largely concerned with the origins and occurrences of various kinds of clay, but there is nevertheless a great deal of geochemical data scattered through the various papers which could become very useful to cement and concrete researchers, and particularly to cement company chemists who are responsible for selecting and processing raw materials.

Any study of feldspars, which are the starting point in the formation of clays, must show that under different environments clays are bound to be different. Some feldspars break down to contain silicon and aluminum in joined composite plates of tetrahedra (multiples of $AlSiO_3$) and some contain aluminum in 6-coördination outside of the tetrahedra lattice. In some, silicon is present as tiny quartz particles (hydrated) with the aluminum as a hydroxide. Obviously in clay processing different results can be expected. Some clays disintegrate readily in water to extremely fine particles; others require more elaborate dispersion processing. Some burn to refractories, which probably do not combine readily with lime; others combine with lime very quickly even at comparatively low temperatures. Those that contain most of their silicon as quartz, regardless of how finely divided, have little reaction between the silica and lime with dry heat even at high temperatures. Consequently, where two or more sources of clay minerals are available for cement raw materials, there may be considerable economy in the selection of one over the other. Moreover, the kind, amount, and distribution of the metal ions, Na, K, Ca, Fe, Mg, etc. have an important bearing on the clay properties.

*American Institute of Mining and Metallurgical Engineers, 29 West 39th St., New York City, 18; Price $6.00 (to non-members, $4.20 to members).

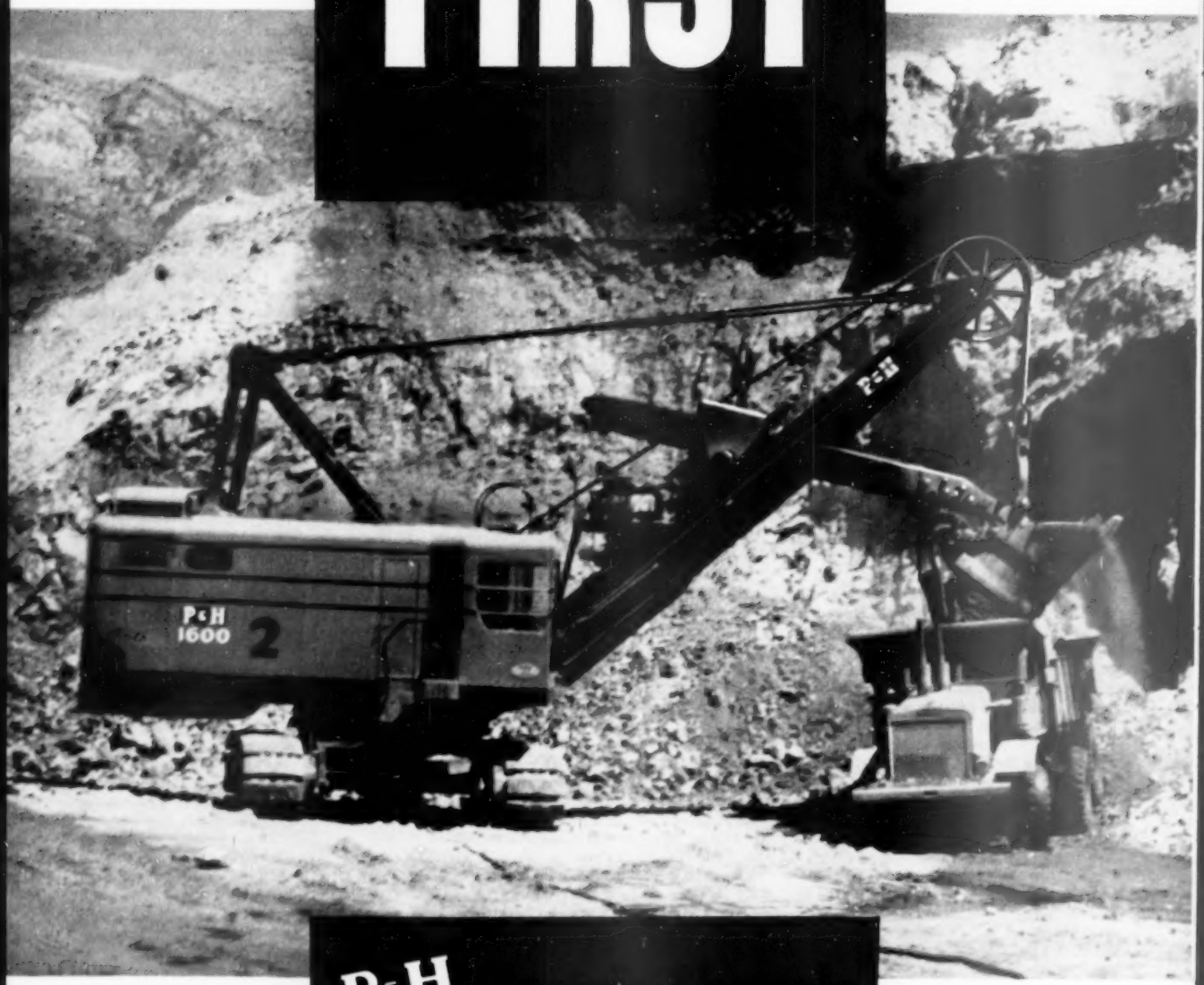
Sources of Pozzolans

Cement company chemists must sooner or later become interested in clays as raw materials for pozzolans. Less is known about this use, in a practical way, than in the time of the Roman Empire. About all that is known today is that some burned clays make good pozzolans and others apparently do not, although it has been scientifically determined that clays are very sensitive in this respect to the calcining temperatures. Clay specialists have developed ways of finding out why different clays may require different heat treatments, or of comparing various clays' reactions to changing temperatures (differential thermal analysis). Clay researchers have also determined that by hydrothermal processes, in the laboratory, clays may be changed from one type to another. So, it is entirely possible that in the future processing of clays and shales, both for cement raw material and for a pozzolan, it may be possible to change one that is naturally unsuitable or unsatisfactory to one that is ideal for the designed purpose—and that purpose might well vary with the particular portland cement in which it is to be used.

By far the best discussion of the possibilities of clays and shales as sources of pozzolans, that we have seen, is the paper by Richard C. Mielenz, Leslie P. Witte and Omar J. Glantz on the "Effect of Calcination on Natural Pozzolans," published by the American Society for Testing Materials in Special Technical Publication No. 99 (Symposium on the Use of Pozzolanic Materials in Mortars and Concrete: 1949). This is a report of laboratory tests on some 70 specimens from various parts of the country including opaline silica, etc., as well as a number of clays and shales. This work lacks an adequate discussion of the structure of clays and how differences in structure may affect their pozzolanic properties, but enough data are given to form the basis for many more research

(Continued on page 61)

FIRST



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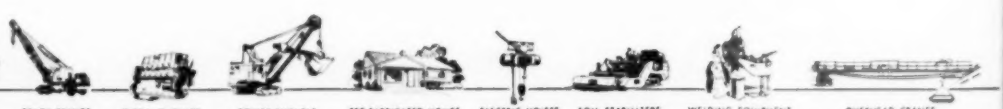

LABOR RELATIONS TRENDS

Probably No Immediate Changes in Taft-Hartley Labor Law—Some Things that Might be Done

By NATHAN C. ROCKWOOD

CAMPAIGN PLEDGES to reduce national expenses, balance the budget, check inflation and give the people sound money, are not the only promises the present administration is finding difficult in meeting. Commentators are now predicting there will be no revision of the Taft-Hartley Act (Labor-Management Relations Act) this session of Congress, and probably none next, which comes just prior to the Congressional elections of 1954. The reason apparently is that the labor-union bosses have learned that any revision now might not resound to their credit or reputation for political influence.

Congressional committees on labor have shown no enthusiasm for bringing the matter up, and within the administration a union-labor official as Secretary of Labor and a businessman Secretary of Commerce show no disposition to agree. Business and industry in general appear to be content to let the law ride as is; they were never particularly keen for its revision. Labor-union bosses are apparently convinced that any revision now, under the announced Republican Party policy of restoring rights and responsibilities to local governments, would result in giving the various state legislatures freedom to adopt labor laws more restrictive than they are now permitted to do under the Taft-Hartley Act. If these labor-union bosses are intellectually honest with themselves, this must add up the fact that public opinion is running against their recent high-pressure political methods, and they would do well to lie low for a while. Anyhow, under present economic conditions they are winning wage increases for their members, which is more important to the rank and file. However, that jeopardizes the progress toward stabilization of the cost of living and the chances for a sound dollar, which are of primary interest to the rank and file of ordinary citizens, who are not members of any privileged group.

General Motors Contract

The principal features of the changes in the General Motors Corporation contract with UAW-CIO practically amount to an entirely new wage agreement. It has already established the pattern for other automobile manufacturers and will have an important bearing on all labor contracts, at least where manufacturers and producers see enough public purchasing ahead to maintain the present market. The new agreement became effective June 1, 1953.

It provides, among other things for a 19¢ per hour increase in base wage rates, but this 19¢ is reduced by the cost-of-living allowance in effect May 31, 1953, and the cost-of-living allowance thereafter will be computed on the new Bureau of Labor Statistics Index (1947-1949=100). In other words, the cost-of-living increase already allowed is made permanent. Beginning May 29, 1953, an "improvement factor" amounting to 5¢ per hour is added to the base rate (for "technological progress.") If a sufficient decline in the cost-of-living index occurs, only the cost of living allowance will be subject to reduction. Adjustment will be made up or down each three months. The increases (or deductions) run from 1¢ per hour of an index of 110.8 or less to 10¢ for 116.6-117.1. For skilled workers new maximum hourly rates are established. Each such employe will receive an increase of 10¢ per hour (over and above the 19¢ already allowed), effective June 1, 1953, unless this increase would raise the rate above the maximum rate for the job, in which case he will receive the maximum (or as much of the 10¢ as to raise him to the maximum).

Comments on Legislation

The most intelligent discussion of labor relations which the Taft-Hartley Act was designed to meet, that we have read to date, were contained in a speech by David L. Cole, until recently the director of the Federal Mediation and Conciliation Service, to the National Academy of Arbitrators at Detroit, Mich., May 1, 1953. It is generally conceded the Federal Mediation and Conciliation Service has done a very fair job. It would have done much better except for political interference from higher authority. Certainly it is close to labor-management relations and therefore Mr. Cole's suggestions should be weighed. An abstract of some of his remarks follow:

"Let me say I subscribe to the considered views of the unbiased authorities that the emergency provisions of the present Labor-Management Relation Act are undesirable. Sumner Slichter has written: 'It is difficult to imagine a more inappropriate set of arrangements for handling serious disputes.' William H. Davis has a quaint way of expressing his disapproval, substantially in this langauge, 'After the erudite judges have found an emergency to exist they issue an injunction which protects the public for a limited period, at the end of which, when the threat to our welfare would appear to be all the more serious, they wrap their judicial robes about them and depart from the scene carrying their injunction with them.' My own observation is that the statutory emergency approach to critical disputes has resulted in postponing the time when the parties are prepared to reach an agreement. The critical nature of the dispute has been enhanced rather than minimized by resorting or threatening to resort to the law. If time permitted, I think I could establish this by detailed reference to our experiences in a number of cases in the past six or eight years. In four cases out of eleven the settlement was not reached until the injunction was ineffective. In addition there are definitely several cases in which settlement was delayed because of the likelihood that the law would be invoked. All told, the picture is not complimentary to the law; nor is it compatible with our doctrine of freedom of action.

Recommendations

"My recommendations for the handling of major disputes have six purposes. The first three, are:

"(1) To reaffirm and implement our declared national industrial relations policy of relying principally on collective bargaining.

"(2) To emphasize that Government's function is essentially only to assist the parties through effective mediation in coming to voluntary agreements.

"(3) To make it clear that the President will intervene only in rare cases of genuine threat to the national welfare, and then not prematurely nor automatically nor to promote the strategic advantage of either party.

"The fourth purpose is: (4) To strengthen the Federal Mediation and Conciliation Service, and improve its effectiveness and standing, by employing labor-management panels at the national and regional levels, with two cabinet officers serving as advisers on the national panel.

"The President could emphasize the following considerations: The National Labor-Management Advisory Panel of the Federal Mediation and Conciliation Service provided for in the Labor-Management Relations Act, 1947, will be re-established as soon as possible. The Secretary of Commerce and the Secretary of Labor will be included in its membership.

"The fifth and sixth purposes are: (5) To provide a fair trial period for this program by avoiding hasty legislative changes or fruitless, an-

(Continued on page 90)

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PEOPLE in the news

Association Officers

GROVER C. BEITER, vice-president and manager of the J. C. White Concrete Co., Des Moines, Iowa, was elected president of the Iowa Ready Mixed Concrete Association at its annual meeting in Des Moines. He succeeds Floyd G. Rubey, Dubuque Ready Mix Concrete Co., Dubuque, Iowa. Leon Yates, Ottumwa, was named vice-president, and Milford L. Hurst, C. W. Shirey Co., Waterloo, Iowa, was re-elected secretary-treasurer. Newly elected directors are John Jacobson, Marshalltown; Howard Macy, Lynnville; and Walter K. Wilson, Estherville. Directors who will continue to serve are John Northington, Davenport; W. D. Ferguson, Jefferson; and William Crawford, Cedar Rapids.

Heads New Office

J. P. HOLT, sales engineer for Basic Refractories, Inc., Cleveland, Ohio, has been placed in charge of the new sales office in St. Louis, Mo. Before joining the company in 1950, he was superintendent of melting at The Midvale Co., Nicetown, Penn. Mr. Holt attended the University of Pennsylvania, where he received a B.S. degree in chemical engineering in 1939 and an M.S. degree in mechanical engineering in 1943. He also received a certificate in ferrous metallurgy at Pennsylvania State College in 1941.

Tells History of Cement

HAROLD KALER, assistant superintendent at the Thomaston, Me., plant of Dragon Cement Co., Inc., New York, N.Y., was guest speaker at a recent meeting of the Kiwanis Club in Rockland, Me. Mr. Kaler covered the history of cement from Egyptian times to the present day. He also explained the operation of the Thomaston plant and described the growth of the mill in the past 25 years.

Appointed Vice-President

FLOYD J. BUFFINGTON has been appointed vice-president in charge of operations of New York Trap Rock Corp., New York, N.Y., and has been made a director of the company. He succeeds Dexter Bullard, who has resigned. Clarence Stetser has been named general superintendent. He was formerly superintendent of the Clinton Point plant, Poughkeepsie, N.Y., and will be succeeded in this position by George White, who has been assistant superintendent.

Mr. Buffington joined the New York Trap Rock Corp. in 1936 as safety engineer and developed the present safety program. He also has been active in industrial safety work both in New York State and nationally. In 1944, he was placed in charge of the real estate and insurance department, and in 1948 was appointed assistant to Mr. Bullard.

Floyd J. Buffington

Mr. Stetser became associated with the company in 1929 as chief electrician. He subsequently became assistant superintendent of the Clinton plant and then superintendent.

Mr. White has been with the company for almost 40 years, starting as chief engineer at the Verplancks plant in Peekskill. He was appointed acting superintendent at Verplancks and then became assistant superintendent of the Clinton plant.

Officers Re-elected

ERIC A. JOHNSTON has been re-elected chairman of the board of the Washington Brick and Lime Co., Dishman, Wash. Neal R. Fosseen was re-elected president; B. V. Kelsey, vice-president; E. L. Frank, vice-president and assistant secretary; Charles P. Lund, secretary; and W. W. Witherspoon, treasurer. Directors re-elected are Walter Toly, W. F. Luhman, Howard M. Wall, and W. J. Goodwin, Jr.

Managing Director

JOHN L. HAYNES, formerly director of the Building Materials Division of the National Production Authority, Washington, D.C., has been named managing director of the Producer's Council, Inc., a national association of building products manufacturers.

Reports Concrete Studies

L. COFF, specialist on prestressed concrete and a contributor to ROCK PRODUCTS, was speaker at the recent 50th anniversary meeting of the Municipal Engineers of the City of New York. Mr. Coff reported on studies made of the use of prestressed concrete in eight overseas countries. Drawbacks to the use of prestressed concrete in the United States, he said, are the wage differential and the lack of competitive design in bidding practice. He emphasized also the cheaper production of spans in building construction on the basis of tests with prestressed concrete spans of 31 ft. made in New York.

Production Managers

ROBERT E. SCIFRES has been appointed production manager of gypsum plants for National Gypsum Co., Buffalo, N.Y., and R. E. Gill has been named production manager of lime plants. Mr. Scifres has been with the company for 11 years and was formerly assistant production manager. He studied at Purdue University and Massachusetts Institute of Technology Graduate School. Mr. Gill, previously superintendent of two of the company's largest plants and production engineer, is a graduate of Cornell University and has served the company for 17 years.

Named Director

ROBERT B. MARSHALL has been elected a director of the Bessemer Limestone and Cement Co., Youngstown, Ohio, and appointed to the executive committee. He is president of the Marshall Mining Co. Officers re-elected are Frank B. Warren, president; J. Q. Adams, vice-president, treasurer and assistant secretary; R. E. Roscoe, vice-president; H. E. Reed, vice-president in charge of operations; and H. G. Hinson, secretary and assistant treasurer.

Named Vice-Presidents

LOUIS W. ROGERS, sales director of the Fredonia, Kan., division of Consolidated Cement Corp., Chicago, Ill., and W. S. Nugent, sales director at Jackson, Mich., have been elected vice-presidents of the company.

Elected President

HARRY A. CLARK has been elected president of Consumers Co., Chicago, Ill. He was formerly executive vice-president. Robert M. Bridges, credit manager, has been named assistant to the president.

Assistant to Vice-President

R. B. FULLER has been promoted to assistant to the vice-president in charge of the phosphate division of International Minerals and Chemical Corp., Chicago, Ill. He was formerly manager of the Florida phosphate department and will be succeeded in this position by F. B. Bowen, formerly manager of the Tennessee phosphate department. C. Lester Richards succeeds Mr. Bowen in Tennessee.

Mr. Fuller has been with the company for the past 27 years, starting in Florida in 1926 as general superintendent of the rock department and becoming manager of the department a year later.

Mr. Bowen joined the Florida phosphate department in 1926, gaining experience in mining, beneficiation and handling of phosphate rock in all phases until 1943, when he was promoted to manager of the Tennessee phosphate department.

Mr. Richards, a graduate of the Columbia School of Mines, joined the company in 1945 as mining engineer at the Tennessee operations. Since 1946 he has served as assistant manager of the Tennessee phosphate department. He was formerly associated with the Anaconda Copper Mining Co. and the Reynolds Mining Corp.

Correction

J. E. PEEPLES has been appointed district sales manager of the Jacksonville, Fla., office of National Gypsum Co., not U.S. Gypsum Co., as announced in the May issue of ROCK PRODUCTS. Mr. Peeples succeeds Fred Rembert, who has resigned because of ill health. He was formerly assistant district sales manager in Cincinnati. J. L. Phillips has been appointed district sales manager in Dallas, Texas. He was district sales manager in Detroit and will be succeeded in this position by A. T. Johnson, assistant district sales manager in Kansas city.

Coordinator of Design

WALTER H. WETZEL has been placed in charge of coordinating design and construction work for National Gypsum Co., Buffalo, N.Y., in addition to his duties as chief mechanical engineer. Walter A. Schmidt, formerly project engineer in charge of rock wool plants, has been assigned to handle special engineering projects. Peter Badame has been promoted to field construction superintendent in charge of all construction work, and Walter V. Sulkowski has been made chief draftsman.

Mr. Wetzel, before becoming chief mechanical engineer, had been chief draftsman. He attended the University of Buffalo and Canisius College and has served National Gypsum for over 16 years.

Mr. Schmidt was associated with the U.S. Army Engineers and designed all the piping on Mt. Morris Dam before joining the company. He attended the University of Buffalo and Brooklyn Polytechnic Institute.

Mr. Badame, a graduate of the University of Missouri, was project engineer on lime plants before his promotion. He directed the installation of hydro-electric power plants for Niagara Hudson Power Corp. and has supervised the design and installation of several of National Gypsum's plants.

Mr. Sulkowski, formerly project engineer on gypsum plants, is a graduate of Syracuse University. Prior to joining the company, he was with the Tennessee Valley Authority.

Heads Development Section

DR. EIVIND HOGNESTAD has been appointed manager of the structural development section of the development department of the Portland Cement Association, Chicago, Ill. He succeeds C. C. Carlson, who has been appointed manager of a newly formed products and applications section. Dr. Hognestad was formerly research associate professor in the department of theoretical and applied mechanics at the University of Illinois. Author of numerous papers, bulletins and research reports pertaining to reinforced concrete design, Dr. Hognestad holds a master of science degree from the University of Illinois and degrees of civil engineer and doctor of technical sciences from the Norwegian Institute of Technology.

Dr. Eivind Hognestad

Personnel Supervisor

JERALD R. LAMBERT has been made personnel and safety supervisor of the Crestmore division of Riverside Cement Co., Riverside, Calif. A native Californian, Mr. Lambert joined the company in 1941. After Army service in World War II, he returned to the company as personnel assistant, assistant personnel manager, and safety supervisor.

On Executive Committee

DATUS E. PROPER, a director of the Uvalde Rock Asphalt Co., San Antonio, Texas, has been appointed a member of the executive committee of the South Texas Chamber of Commerce. He has served as chairman of the highway committee for the past year and is a past president and former chairman of the highway committee of the San Antonio Chamber of Commerce. He is a member of the board of directors of the San Antonio Chamber at the present time.

Mr. Proper joined the Uvalde Rock Asphalt Co. in 1923 as engineer and assistant general superintendent of production, later becoming vice-president and general sales manager. He retained this position until 1937 when he resigned to become vice-president of the Texas Good Roads Association. He resigned from this position in 1943 to enter the wholesale petroleum business in San Antonio. Since 1952, he has been vice-president and general manager of the Pearl Brewing Co., San Antonio.

Named Superintendent

RICHARD P. SCOTT has been appointed superintendent of production for five plants of Penn-Dixie Cement Corp. at Nazareth, Penn. For the past 15 years he has been assistant superintendent of the Toledo plant of Medusa Portland Cement Co., Cleveland, Ohio. Prior to that he was manager of manufacturing research for the Portland Cement Association, Chicago, Ill.

Appointed Vice-Presidents

W. S. COWELL, formerly general sales manager, has been appointed vice-president in charge of sales of Atlas Asbestos Co., Ltd., Toronto, Canada. J. C. Anderson has been named vice-president in charge of production. He was formerly production manager.

Export Sales Manager

WILLIAM CROSCUP has been appointed manager of export sales, National Gypsum Co., Buffalo, N.Y. The export sales department has been moved to the Graybar building in New York, where the district sales office is located, and Mr. Croscup will make his headquarters there.

Sales Representative

BRUCE C. ROSS, formerly with the Syracuse sales division of Dun & Bradstreet, has been appointed a salesman in the Syracuse division office of The General Crushed Stone Co., Syracuse, N.Y.

Executive Director

HENRY E. BOLLMAN, Denver, Colo., has been appointed executive director of the Structural Clay Products Institute, Washington, D.C.

Joins Pipe Concern

W. A. KRATZERT, a former engineer for the Florida State Highway Department, has joined the Universal Concrete Pipe Co., Columbus, Ohio, as state engineer representative. He will serve plants and offices in Florida, including Miami (Dania), St. Petersburg, Tampa, Tallahassee, and the affiliated Florida Concrete Pipe Co., Ocala, Fla. Mr. Kratzert was graduated from Tri-State College in 1925 with a B.S. degree in civil engineering. He has had 30 years of engineering experience in Florida, including ten years as state highway maintenance engineer. Prior to that he was connected with the U.S. Engineers, Charleston, S.C.

Elected Vice-President

DEOTIS L. MARLETT has been elected vice-president of Great Lakes Carbon Corp., Los Angeles, Calif., and general manager of the dicalite and perlite divisions. He has been assistant general manager since 1952. Mr. Marlett was formerly associated with the Bonneville Power Administration, where he served for almost 12 years. During his service there he was awarded the Distinguished Service Medal of the Department of the Interior for his service as assistant administrator and for his activity in organizing the Defense Electric Power Administration.

Association President

GEORGE W. HANDY, commodity manager, acoustical sales, National Gypsum Co., Buffalo, N.Y., has been re-elected president of the Acoustical Materials Association. He has been a member of the board of directors since the beginning of the association and has served on numerous committees. E. S. Graybill, manager, acoustical department, Armstrong Cork Co., Lancaster, Penn., was re-elected vice-president.

Officers Elected

P. P. TYLER was recently elected president of Gypsum, Lime and Alabastine, Canada, Ltd., Montreal, Canada. C. Gordon Cockshutt was named chairman of the board, and J. E. McConnell and S. G. Dixon were appointed vice-presidents. Directors of the company are C. Gordon Cockshutt, P. P. Tyler, J. E. McConnell, S. G. Dixon, Robert A. Bryce, R. H. Cooper, George H. Dobbie and J. H. Robinson.

Commissioner Retires

THOMAS H. MACDONALD, commissioner of public roads, U.S. Department of Commerce, Washington, D.C., has retired after nearly 34 years of outstanding service to the nation. He has directed the work of the federal road building organization since 1919, first as chief of the Bureau of Public Roads, and since 1939 as commissioner of public roads. Mr. MacDonald has received many honorary awards during his career, including the honorary degree Doctor of Engineering and the Marston Medal for achievement in engineering by Iowa State College. He also received the Medal of Merit for outstanding service during World War II. He is honorary member of the American Society of Civil Engineers and the Institute of Traffic Engineers. He is a member of the executive committee of the American Association of State Highway Officials and the Highway Research Board. He is a member of the National Safety Council and the American Planning and Civic Association, and chairman of the committee on program and planning of the President's Highway Safety Conference.

Mr. MacDonald will continue his activities in the highway field after his retirement. He plans to go to Texas A. & M. College to act as consultant in the development of a Transport Institute at that college.

Plant Superintendent

M. F. PARSONS has been appointed plant superintendent and engineer of the Round Rock White Lime Co., Austin, Texas. He was formerly associated with Gypsum, Lime and Alabastine Co. Ltd., Caledonia, Canada. Mr. Parsons is well known in the lime industry and has published a number of articles dealing with the engineering end of the industry. Round Rock White Lime Co. is presently engaged in an expansion program which, when completed, will approximately double its production. Construction is expected to be completed by June 1.

Chief Engineer

GEORGE E. STONE has been appointed chief engineer of Basic Refractories, Inc., Cleveland, Ohio, to succeed the late W. W. Patnoe. Mr. Stone joined the engineering department in 1921. He was appointed chief plant engineer in 1941 and has been acting manager of the Ohio Works since 1952. Mr. Stone was born in Tiffin, Ohio, where he attended Heidelburg University.

Consulting Engineer

JAMES A. BARR, SR., formerly chief engineer of the International Minerals and Chemical Corp., Chicago, Ill., has resigned as chief of the Industrial Minerals Branch, Defense Materials Procurement Administration, Washington, D.C., to return to his private consulting practice in Mt. Pleasant, Tenn.

Operations Manager

CHRISTIAN F. BEUKEMA has been named general manager of operations of the Michigan Limestone Division of the U.S. Steel Corp. in Detroit, Mich. He was formerly with the raw materials division in Pittsburgh, Penn. A native of Grand Haven, Mich., Mr. Beukema is a graduate of Michigan State College with a degree in civil engineering.

OBITUARIES

CHARLES R. PARKS, retired treasurer of the North American Cement Corp., New York, N.Y., died May 21 in Albany, N.Y. He had been taken ill last March while on vacation in Sarasota, Fla. Well known in the cement industry, Mr. Parks had been with the company and its predecessor, Helderberg Cement Co., 49 years before his retirement three years ago. Born in Newcomb, N.Y., he was graduated from Albany Business College. He started as a clerk for the Helderberg Cement Co. and became treasurer when it consolidated with the North American Cement Corp. in 1926. For many years he was in charge of the offices in Albany and New York City.

WILLIAM H. HURLEY, metropolitan Chicago sales manager for Marquette Cement Manufacturing Co., Chicago, Ill., died June 6. He was 66 years old. Mr. Hurley first joined the sales staff of Marquette in 1914. Three years later he became associated with Consumers Co. and later joined Universal Atlas Cement Co. and then H. D. Conkey and Co. as salesman. He returned to Marquette in 1933 and two years later was appointed sales manager.

CHARLES JOSEPH KNICKERBOCKER, superintendent of the Sugar Creek, Mo., plant of Missouri Portland Cement Co., St. Louis, Mo., died May 23 at the age of 43. He had been with the company for the past two years. Previously Mr. Knickerbocker was chief chemist at the Harleyville, S.C., plant of Carolina Giant Cement Co., Philadelphia, Penn., and from 1942 to 1949 was chief chemist at the Fredonia, Kan., plant of Consolidated Cement Corp., Chicago, Ill.

WILLIAM PATRICK TOBIN, president of Tobin Quarries, Inc., Kansas City, Mo., died May 18 after an illness of about five years. He was 54 years of age. A native of Holton, Kan., Mr. Tobin attended St. Mary's high school and St. Mary's College at St. Mary's, Kan. He had been head of the firm for 25 years.

W. RAY CLARK of Everett & Clark Contractors, Plattsburg, Mo., passed away recently after a short illness. He was a director of the National Agricultural Limestone Institute, Washington, D.C., and had been active in affairs of the association.

HAROLD C. JONES, general sales manager of the Quincy, Mich., office of Huron Portland Cement Co., Detroit, Mich., died May 24.

TEXACO HELPS MAINTAIN BUILDING PACE AT FOLSOM DAM

Contractor: Merritt-Chapman & Scott Corporation and The Savin Construction Corporation

FOR the real lowdown on how Texaco Lubricants and Texaco Lubrication Engineering Service simplify upkeep, talk to equipment maintenance men. At Folsom Dam, for instance, you'll hear reports like these—

"We're getting extra long life from chassis parts in our trucks, tractors, 'dozers and other equipment. *Texaco Marfak* gives the best protection against wear and rust of any lubricant we ever used — stays on the job in spite of heavy loads, jolts, dust and mud.

"Everything said about *Texaco Marfak* also goes for *Texaco Marfak Heavy Duty* in wheel bearings. And we like the fact that no seasonal change is necessary.

"*Texaco Track Roll Lubricant* is giving us longer-than-ever service from our rollers — and they really take a beating."

Those are just three of the six basic Texaco Lubricants needed to serve all major construction equipment. Ask your Texaco Lubrication Engineer about the Texaco Simplified Lubrication Plan and how it can help you avoid mistakes, save time and money.

Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

☆ ☆ ☆

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

FOLSOM DAM, Folsom, California — said to be the world's largest earthfill and concrete structure of its kind — is scheduled for completion late in 1954. To meet this date, innumerable pieces of construction equipment must be kept working at top efficiency. Effective lubrication — *Texaco* — is one of the contractor's biggest helps.

TEXACO

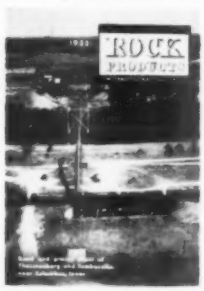
TEXACO Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

industry news

Cover Picture

ON THE COVER of July ROCK PRODUCTS is an illustration of the Jay Ray No. 2 plant of Thorstenberg and Tamborello near Columbus, Texas. This company, with offices in Houston, Texas, operates five plants within a radius of 30 miles of each other. Jay Ray No. 2 plant is the largest. It is a unique plant with the raw materials being transported to one side of the river and dumped into a series of steel hoppers which feed onto a short belt, below, that in turn supplies a long conveyor belt that is supported on a suspension bridge over the river bed to the plant on the other side.



Pumice Processing Plant

WHITTAKER, CLARK & DANIELS, INC., New York, N.Y., which recently sold its pumice operations at Grants, N.M., operated by its subsidiary, Pumice Corp. of America, is now importing specially selected crude pumice from Italy, for grinding and processing at its new plant in South Kearny, N. J. Large storage facilities for crude ore are maintained at the plant to enable uninterrupted production and shipment.

In the processing procedure, the ore passes from the storage bins through a crushing operation and then over a magnetic separator to remove any free iron, wire or other foreign matter. It then passes through a dryer to remove excess moisture, after which it is screened and graded. Three grades of pumice are produced.

To Increase Fleet Facilities

NEW YORK TRAP ROCK CORP., New York, N.Y., recently awarded a contract for the construction of 12 new deck scows, which is the first step in the company's proposed $1,000,000 fleet expansion and replacement program, as recently announced by Wilson P. Foss, III, president. The 12 deck scows, which are the first of a fleet of 30 to be constructed by the end of 1954, are being built by Sound Ship Building Corp., College Point, Long Island.

As stated by Mr. Foss, "The new scows will augment our present fleet sufficiently to allow us to meet greatly increased demands for crushed stone required for important state highway and municipal street programs as well as for national defense and private construction. It is a further move in our expansion plans which include the erection of additional stone-processing facilities at our Haverstraw location at an estimated cost of $1,000,000." (For a complete description of the company's expanded facilities at the Haverstraw location, see ROCK PRODUCTS, May, 1953, p. 71.)

Each of the 1000-ton, stone-carrying scows will be 115 ft. long by 36 ft. wide. Following company policy of naming scows after long-service employes, the first of the new group is to be named the Lillian M. Byers, in honor of the assistant secretary who has been with the company for over 25 years.

Opens Crushing Plant

S. J. WICK recently announced the opening of a crushing plant in Mayes County between Pryor and Mazie, Okla. Two houses have been erected at the plant site to accommodate workers employed by the company. The plant produces a crushed white rock, known as "Wicklite."

Gravel Plant

JAMES P. WEBB, Breckenridge, Colo., has started operations of a sand and gravel plant in Summit County, Colo.

Expands Gypsum Plant

NATIONAL GYPSUM CO. has begun a $1,000,000 expansion program at its plant in Savannah, Ga. The expansion is expected to increase plant production by about 30 percent.

Constructs Shale Plant

MONARCH CEMENT CO., Humboldt, Kans., is building a new shale crushing and drying plant to replace its present plant. It is being built near the present plant buildings and will have cost approximately $750,000 when completed. Plant equipment will include crushers, dryers, two haulage trucks, dust collectors and conveying systems.

Twenty-Fifth Anniversary

LONE STAR CEMENT CORP.'S Spocari, Ala., plant recently celebrated its 25th anniversary. The celebration featured a barbecue luncheon for employes and their families, a trip through the plant and other entertainment. Gold watches were presented to all employes who had served the company continuously for 25 years.

Silica Plant

SILICA SAND CORP., recently formed, conducted tests to determine the quality and extent of its sand holding at the Robert Florine farm south of Ottawa, Minn., and found them favorable preparatory to building a processing plant. The deposit has very little overburden and is a white sand of high silica content.

Re-Opens Plant

HARRIS CRUSHED ROCK CO., Independence, Mo., has resumed operations at its plant after an enforced shutdown since the 1951 flood. The plant has a daily production of 1000 tons of crushed stone and underwent modernization, including electrification, during the shutdown.

Harold Stevens (left), assistant superintendent, Painesville, Ohio, plant of Standard Portland Cement Division, Diamond Alkali Co., presents P.C.A. Silver Honor Roll Certificates, for 25 or more accident-free years, to (left to right): Noah Holbert and Merritt Allen (seated); and William Kivimaki, Vance Fleming and Art Lindsco (standing). Also receiving the award, but not shown, was Jacob Malkamaki

New York Producers Meet

THE EMPIRE STATE SAND, GRAVEL AND READY MIX ASSOCIATION held its second annual meeting in Syracuse, N.Y., June 1-2, 1953. The meeting was opened with a directors' luncheon and meeting, followed by a social hour and banquet. Principal speaker at the banquet was Vincent P. Ahearn, executive secretary, National Sand and Gravel and National Ready Mixed Concrete Associations, whose subject was "Political Overtones," in which he discussed percentage depletion, public safety and public relations, the Lucas HR-2545 bill which affects group or collective bargaining by competing employers, and other political matters.

The following morning was devoted to a business session which included the treasurer's report, the executive secretary's report, a report by the constitution and by-laws committee, and the election of officers. At the luncheon meeting, the ready-mixed concrete committee reported its activities of the past year. Guest speaker was Stanton Walker, director of engineering, National Ready Mixed Concrete Association, who discussed the recent ready-mixed concrete truck-mixer tests.

The meeting was concluded with a meeting of the newly elected officers and directors. Membership in the association has now increased to 83 active and 35 associate members.

Perlite Certification Program Launched

A NATION-WIDE LABELING AND CERTIFICATION PROGRAM for perlite plaster aggregate has been launched by the Perlite Institute. The program establishes an authoritative and carefully policed "seal of guaranteed quality" to identify perlite plaster aggregate which passes frequent periodic examination by the independent Pittsburgh Testing Laboratory and is guaranteed by the manufacturer to conform to A.S.T.M. Specification C 35-52 T.

The Perlite Institute reports that over 30 perlite producers, in all sections of the country, have already signed the certification agreement, specifying their responsibilites in using the certification seal. The new seal, shown in the illustration, features the insignia of both the Perlite Institute and the Pittsburgh Testing Laboratory.

The specification referred to was established last year by the American Society for Testing Materials and is the recognized quality standard for all types of plaster aggregate. It has also been adopted as part of the American Standard Association plastering specification A 42.1, which most architects use as the basis for their plaster recommendations. The specification sets a minimum weight of 7½ lb. per cu. ft. for perlite aggregate and prescribes the proper proportion of coarse and fine particles to give the plaster good workability, strength and permanence when applied in accordance with good job practice.

The Perlite Institute office will administer the program and control the use of the certification seal. Producers

Perlite plaster aggregate certification seal

are licensed to use the seal only after Pittsburgh Testing Laboratory agents have secured samples from the plant and found the aggregate to conform to the specification. Laboratory samples are obtained by an inspector who uses a special sampling tube to obtain samples from bags of perlite selected at random. After a manufacturer is licensed, his certified aggregate is sampled and tested at least four times yearly to assure consistent compliance with specification requirements.

Portland Cement Production

THE PORTLAND CEMENT INDUSTRY produced 21,802,000 bbl. of finished cement in April, 1953, as reported to the Bureau of Mines. This was an increase of 10 percent compared with the output in April, 1952. Mill shipments totaled 20,891,000 bbl., a decrease of 4 percent from the April, 1952 figure, while stocks were a fraction of 1 percent above the total for the same month in 1952. Clinker production during April, 1953, amounted to 21,709,000 bbl., an increase of 11 percent compared with the corresponding month of the previous year. The output of finished cement during April, 1953, came from 155 plants located in 37 states and in Puerto Rico. During the same month of 1952, 19,817,000 bbl. were produced in 153 plants.

Walsh-Healey Change

THE WALSH-HEALEY PUBLIC CONTRACTS ACT, as recently amended, revises the definition of a "regular dealer" in agricultural liming materials. The act, which applies to federal government supply contracts in excess of $10,000, imposes a number of requirements on contractors. Previously, one provision required that a contractor, to receive government contracts, must be designated as a "manufacturer of" or a "regular dealer in" the supplies to be furnished under the contract, thus requiring maintenance of an establishment in which the supplies are kept in stock. The amendment to the act, which has a more liberal interpretation of "regular dealer," now reads as follows:

"A regular dealer in agricultural liming materials may be a person who owns or controls the necessary equipment customarily required for delivering agricultural liming materials to farms or for spreading such materials on fields, who has made arrangements to purchase liming materials of the general character described by the specifications and required under the contract from a manufacturer, and who offers such material for sale to the public in the usual course of business."

Quarry Blasts Defended

EARTH VIBRATIONS from protested quarry blasting in Cedar Rapids, Iowa, were deemed "within safe limits," in an engineer's report recently released by the Cedar Rapids mayor. After several complaints by area residents, Concrete Materials and Construction Co. employed Jules E. Jenkins of Vibration Measurement Engineers, Chicago, Ill., to conduct an on-the-spot survey of quarry blast effects. Seismographic tests were conducted at two specific points near the quarry. At both locations, the ground movement was found to be only 0.0015 in., which would be too slight to cause any damage or undue concern. Mr. Jenkins' over-all conclusion was, ". . . It is our considered opinion that the earthborne vibrations resulting from the blasting operations as presently carried on in the Otis quarry by the Concrete Materials and Construction Co. are within safe limits for near-by private property."

Slag Operation

GARY SLAG CORP., Chicago, Ill., recently signed a contract with American Steel & Wire Co., a division of U.S. Steel Corp., to produce an expanded slag lightweight aggregate at its Duluth, Minn., works. Gary Slag Corp. also operate a slag processing plant on the property of U.S. Steel Corp. in Gary, Ind. Approximately 100,000 cu. yd. of aggregate will be produced annually by the Kinney-Osborne process. W. J. Flynn has been appointed superintendent at the Duluth operation and R. J. Graham, sales engineer. R. Newton McDowell is president of Gary Slag Corp.

Gypsum Plant

KAISER GYPSUM CO., subsidiary of Permanente Cement Co., Oakland, Calif., is currently completing negotiations for the purchase of property and the construction of a new gypsum plant on the Richmond, Calif., waterfront. Present facilities at the Redwood City plant will be moved to the new location.

Adds Employe Building

RIVERSIDE CEMENT Co., San Francisco, Calif., is adding a new employes' building to its plant at Oro Grande, Calif., which will serve as a combination dressing room, wash and shower room and lavatory. The 6500-sq. ft. building, which is expected to be finished by October, 1953, will be built almost entirely of concrete products, including precast concrete structural members, concrete cast in place, stained concrete floors, concrete block, and cement roofing shingles.

The specially-textured wall panels, columns, girders, beams and roof joists are to be precast on the concrete floor slabs and then raised to position by cranes. Although most of the larger members will be cast in wooden forms, pressed paper forms will be used in casting rounded columns. Wall struts and roof slabs will be cast in place after the prefabricated members are in position. Weights of precast members will range from 1500 lb. to 8 tons.

Driver Safety Awards

CONSOLIDATED ROCK PRODUCTS Co., Sun Valley, Calif., recently held its annual truck drivers' safe driving award breakfast at the Los Angeles Police Academy. Certificates of honor for safe driving for periods ranging from 6 months to 19 years without a chargeable accident were awarded to 160 of the 248 drivers. In addition to the certificates, gold and silver lapel buttons were given to 29 drivers who had completed 4 to 19 years without accident. Robert Mitchell, president of the company, is also chairman of the Joint Safety Committee for the National Sand and Gravel and National Ready Mixed Concrete Associations, president of Los Angeles Metropolitan Traffic Association, chairman of Defense Mobilization Service Committee for the State of California, and a member of the board of directors for the Greater Los Angeles Chapter National Safety Council.

Pavement Yardage

AWARDS OF CONCRETE PAVEMENT for the month of May and for the first five months of 1953 are listed by the Portland Cement Association as follows:

	Sq. yd. awarded	
	During May 1953	During first five months 1953
Roads	5,236,752	17,144,290
Streets and alleys	2,682,487	10,653,479
Airports	413,450	5,460,849
Totals	8,332,689	33,258,618

Closing Magnesium Plants

FIVE OF THE GOVERNMENT'S six magnesium plants are being closed down, according to a recent announcement by the General Services Administration, following a Munitions Board review of magnesium needs for the national stockpile and other defense purposes. The government's largest plant, at Velasco, Texas, operated by Dow Chemical Co., will remain in operation. The plants being closed are located at Painesville, Ohio, Canaan, Conn., Wingdale, N.Y., Manteca, Calif., and Spokane, Wash.

The shut-down will reduce government magnesium capacity from 196,000,000 lb. per year to about 80,000,000 lb. which, in addition to the approximate 56,000,000-lb. productive capacity of private industry, is expected to supply all magnesium demands.

Canadian Gypsum Plant

CANADIAN GYPSUM Co., Toronto, Ont., Can., subsidiary of United States Gypsum Co., Chicago, Ill., recently announced plans to build a new plant in Montreal, Que., for the production of gysum plasters and gypsum board products. The company is currently completing an expansion program at its Guelph, Ont., plant, designed to increase production by 40 percent.

Kiln Conversion

AZBE CORP., St. Louis, Mo., has recently been retained by Planta de Cal Hicaco, Inc., Fajardo, Puerto Rico, to provide designs for converting one of the company's two lime kilns from mixed-feed operation to oil firing by the Azbe system, which features side and center burners. R. F. Veve is president of the Puerto Rico company.

Calaveras Stockholders' Report Is Optimistic

H. C. MAGINN, executive vice-president, Calaveras Cement Co., San Francisco, Calif., at a recent stockholders' meeting, reported that the company's cement shipments during the first four months of this year were considerably ahead of any like period since Calaveras has been in business, and that the month of April set an all-time high for shipments during any single month. He also stated that the outlook for the remainder of 1953 is encouraging. The Pine Flat Dam contract, which was taken at a low price during 1949, has been completed. Prices of all grey cements were increased 20 cents per bbl. April 1, and white cement prices increased 25 cents per bbl. April 15. Also, due to recent expanded plant capacity, production is at a much higher rate, remaining consistent with the increased shipments.

Mr. Maginn's forecast regarding business prospects was very optimistic. Citing U.S. Department of Commerce figures, he pointed out that construction put in place during the first quarter of 1953 set a new all-time record. He also cited a survey report presented at a recent meeting of the national convention of the Associated General Contractors of America which he attended as vice-president of the Northern California Chapter. At the convention, a national A.G.C. survey was presented predicting that the amount of building, highway and heavy construction coming on the market for the next six months would be greater than in the comparable period last year. The greatest increase is expected to occur in highway construction. The Pacific Coast is expected to be in the forefront of the entire nation.

Even though the military services have halted construction on projects less than 20 percent completed, and suspended advertising for bids on new jobs, pending review of their essentiality, increases in highway and other building are expected to keep national construction activity at very high levels. Mr. Maginn stated that none of his company's present contracts are affected by the military "freeze order."

COMING CONVENTIONS

August 17-19, 1953—
Cinder Concrete Products Association, Annual Meeting, Hotel Claridge, Atlanta City, N. J.

August 31-September 2, 1953—
A.I.M.E., Minerals Beneficiation Division, Fall Meeting, Hibbing, Minn.

September 21-24, 1953—
American Mining Congress, Annual Convention, Seattle, Wash.

September 28-30, 1953—
National Ready Mixed Concrete Association, Semi-Annual Meeting of Board of Directors, Broadmoor Hotel, Colorado Springs, Colo.

September 28-30, 1953—
National Sand and Gravel Association, Semi-Annual Meeting of Board of Directors, Broadmoor Hotel, Colorado Springs, Colo.

October 19-23, 1953—
National Safety Congress and Exposition, Conrad Hilton, Congress, Morrison and Hamilton Hotels, Chicago, Ill.

October 29-30, 1953—
American Concrete Institute, Southwest Regional Meeting, Rice Hotel, Houston, Texas

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Feed end of conveyor is mounted on heavy metal skids

Portable Conveyor

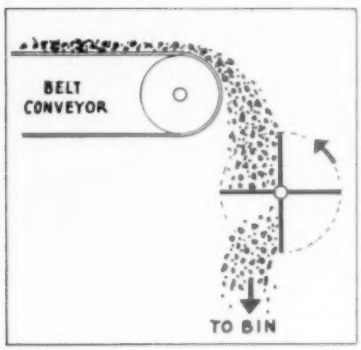
A SMALL SAND AND GRAVEL OPERATION in the Northwest builds up a ground storage pile by means of trucks and a portable field conveyor unit. The feed end of the conveyor is mounted on heavy metal skids so the unit can be moved about the yard as desired.

Rolls With Split Frame

AT ONE ROCK PRODUCTS OPERATION, an Austin-Western jaw crusher is used as the primary unit and a set of Pioneer double rolls are used as secondary crushers. The set-up is such that the two crushers can be used together or operated separately. The illustration gives the essentials of the set-up. The frame of the rolls has been split horizontally to expedite roll-shell replacements. The company keeps on hand an extra shaft, core, star-gear, and shell so that when a replacement of a worn shell is necessary, the split shell enables quick replacement. This system is said to save many hours of maintenance time.

Reducing Segregation

AT A CRUSHED-STONE PLANT in the Southwest, blended material falls to a short conveyor belt serving a shuttle. In addition to moving the material in the desired direction, this transfer gives the blended material an additional mixing. At the end of the shuttle, a paddle-wheel-type unit, as shown in the line sketch, has been mounted. The falling stone fills one of the quadrants and is then spilled almost vertically into the bin below. This destroys the "throw" of the stone and gives the material an additional mixing. The device is said to have considerably reduced segregation in the bins and requires no power for its operation.



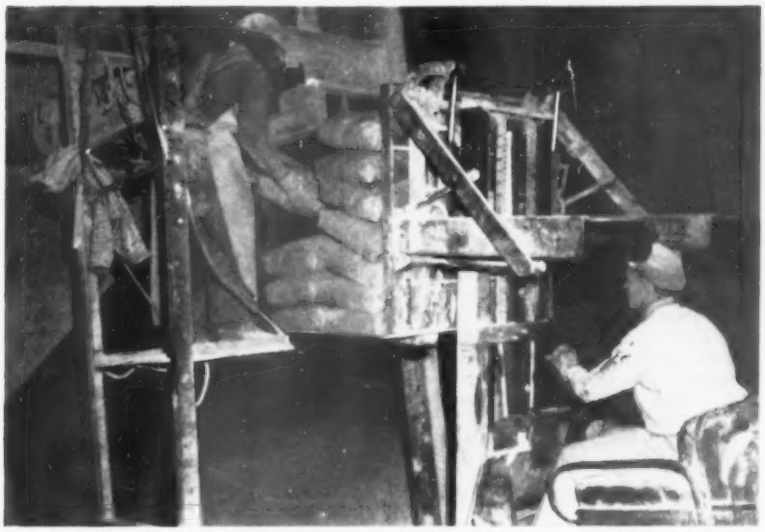
Blended material is discharged to paddle-wheel unit which discharges to bin below

Tailings Pump

REJECTS from a washing plant often have to flow a considerable distance to the disposal area. If the launder carrying the pulp is too flat, it may sand up. A southern producer allows the pulp stream to flow to a rectangular box (shown in the illustration), where some of the coarser sand in the pulp can settle. This portion is pumped to waste. The non-settling portion flows by gravity to its disposal area.

Belt conveyor at left delivers the roll product back to the main belt. A chute serves the primary jaw crusher

Pulp stream flows to rectangular box; waste coarse tailings are pumped to disposal area and slimes flow to pond



Bagged material slides from packer chute onto raised fork of lift truck, which is slightly lowered to receive each succeeding bag

Loading to Rail Cars

AT THE BUCHANAN, VA., PLANT of Liberty Limestone Corp., bagged material is transferred from the packing machine to rail cars by a simple lift-truck operation. As bags slide down a chute from the packer, they are guided into position onto the raised fork of a truck. As each bag is placed, the truck driver lowers the lift to keep it at the level of the chute discharge. Note, in the left of the illustration, the assistant aligning the bags, stands on an adjacent platform attached to the ladder.

Tilting Grizzly

AN OPERATION in the Southwest has an excess of cobbles (plus 5 in.) that are wasted. Although the plant has primary and secondary crushers, there is still more of the coarse material than the market absorbs. Formerly, the cobbles were scalped out at the primary truck-hopper grizzly. Since it was a conventional horizontal grizzly, removing the cobbles to the waste bin involved labor, so a tilting grizzly was therefore installed. Euclid rear dump trucks dump to the new grizzly, after which the crusher operator tilts the assembly. The fines discharge to the bin below which serves the 15- x 36-in. Diamond primary jaw crusher, and the plus 5-in. cobbles slide into the bin and are trucked to waste. About 8 percent of the pit material is returned.

The bed of the grizzly is 25 x 20 ft., and weighs 11 tons. It is made of 80 lb. rail and reinforced with manganese abrasion-resisting rods. There are two oil-operated hydraulic hoists spaced on the 25-ft. length which do the lifting, aided by counterbalances. The telescopic hoists are of the 3-unit type, with three telescoping tubes which were obtained from Heil hoist units taken from the company's river-haulage units. The two oil pumps used are driven off the same motor so as to give a more even lift.

Reinforcing Gondolas

A TEXAS SAND AND GRAVEL OPERATION uses 40-cu. yd., standard-gauge gondolas as a part of its pit-to-plant transportation system. The cars are loaded by an 8-cu. yd. Hendrick perforated bucket, swung by a Bucyrus-Erie dragline that has a 175-ft. aluminum alloy boom. Dumping 8 cu. yd. at a time into most any conventional open-top car can spring the ends of the car when the load is dropped from the bucket. Side bulging can be minimized by cross members. This producer placed used steel cable from the load line of the dragline around the cars as shown in the illustration. After placing, the cables were tightened by a suitable jack. Cable clamps are used.

Gondola cars reinforced with steel cables to prevent springing the ends of the car when heavy load is dumped from bucket

Gravel Sampler

A DEVICE that has been used on the Pacific Coast for sampling sand and gravel deposits was developed for sampling gravel areas containing gold or other heavy valuable materials. The rig is a clam-shell-type digging unit mounted on a truck for mobility. It is hydraulically operated and digs a rectangular-shaped hole. Casings cannot conveniently be used. It is said to be fast in operation and will dig 40 to 50 ft. The machine is made by the Par "X" Placer Equipment Co., Benecia, Calif.

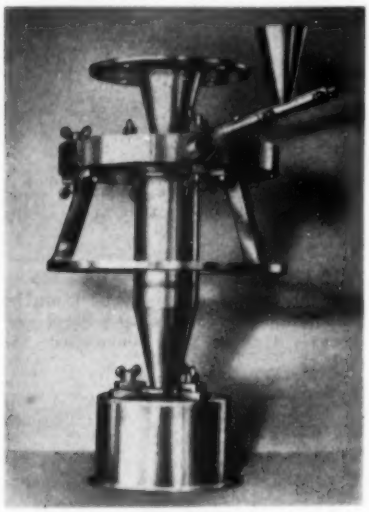
Clam-shell-type digging unit, mounted on truck

Left: Trucks discharge to tilting grizzly. Center: Grizzly is tilted to discharge fines to bin below; note the counterbalances at left. Right: Cobbles slide to waste bin at left

NEW Machinery

Jet Pulverizer

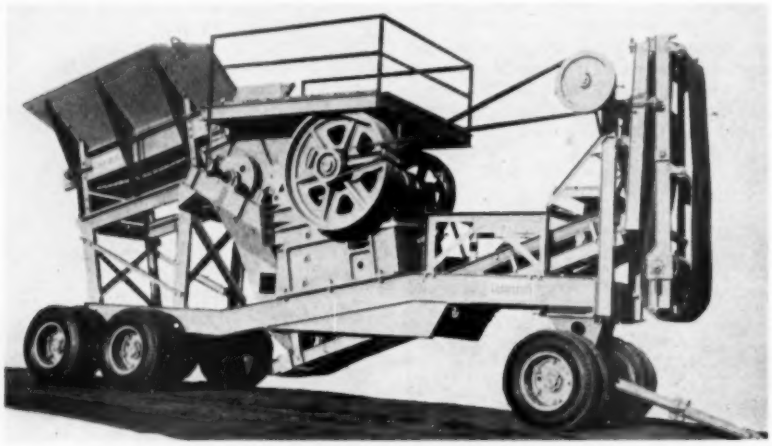
STURTEVANT MILL CO., Boston, Mass., has acquired all interests in the Micronizer jet pulverizer manufactured by Micronizer Co., Moorestown, N. J. The jet pulverizer grinds and reduces solids to micron ranges and includes among its applications such materials as sulphur, mica and other rock products.



Pulverizer grinds solids to micron size

Portable Crushing Unit

IOWA MANUFACTURING CO., Cedar Rapids, Iowa, has introduced Model AAA-GR, a portable primary crushing unit, redesigned from previous models to incorporate a vibrating grizzly which acts as a by-pass for materials under crushing size. The action of the grizzly permits only the larger rock to reach the crushing chamber, keeping it free from clay or other compacting material, dirt or fines. Model AAA-GR is equipped with a 22- x 36-in. roller-bearing jaw crusher, a 36-in. x 8-ft. heavy-duty apron feeder, a 7- x 4-ft. hopper, and a channel type, clutch-controlled 30-in. x 28-ft. delivery conveyor with a 10-ft. discharge clearance, all mounted on a semi-trailer, pneumatic-tired truck with a tandem rear axle.



Crusher equipped with vibrating grizzly

General Purpose Relays

GENERAL ELECTRIC CO., Schenectady 5, N.Y., has introduced a line of general purpose relays, designated as CR2790-E, rated from 6 to 300 volts; 60, 50 and 25 cycles plus d-c; and 10 amp. continuous contact rating. Tension and wear are reduced through the use and repositioning of a braided shunt. The relays may be used as starters for small a-c motors where motors have sufficient overload protection. They are also suitable for application in electronic equipment and air conditioners, where small space is a major factor. Conversion units may be used with standardized, open-form relays to provide greater utility and reduction in inventory.

Liquid Scrubber

JOHNSON-MARCH CORP., Philadelphia, Penn., has brought out the type V, liquid precipitator scrubber for control of dust from rotary dryers, kilns, mixers, pulverizer exhausts, asphalt plant stacks, and similar industrial operations. Centrifugal separation, directional and velocity control, expansion of gases, and inertial separation are employed in the process. Use of a compound M, in the final cleansing, wets the dust which ordinarily repels water and aids removal of particles from the gases. The dust is reduced to a watery sludge and then discharged through a sludge discharge flange. Approximately 2 gal. of water, at 40 to 50 p.s.i. per 1000 cu. ft. of gas, is needed per min. A recirculation system can be put into practice where water supply is a problem. The scrubbers of ¼-in. steel plate have hinged inspection doors and are available in sizes ranging from 14 ft. 10 in. to 32 ft. 10 in. high with capacities of 1500 c.f.m. to 48,000 c.f.m. Linings of corrosion resistant metal can also be installed.

Recriprocating Feeder

MCLANAHAN & STONE CORP., Hollidaysburg, Penn., has developed a reciprocating plate feeder, Model HDF, which employs the bottom-feed principle in handling material from trucks, cars, hoppers, storage bins, etc. It has a capacity range of up to 500 t.p.h. with the rate of flow controlled to synchronize with the producing capacity of elevators, conveyors or other equipment. It discharges on the inside of a crusher-hopper by means of a plate carried on four rollers. The reciprocating motion is imparted to the plate by a babbitted, adjustable eccentric which is lubricated by a force feed oiler. Power is delivered from the electric motor through V-belts to the Dodge torque arm reduction unit mounted on the eccentric shaft. A variety of drive styles are available, including chain and sprocket drive from crusher or other equipment. Model HDF has a jaw clutch mounted on the shaft allowing the feeder to be stopped without stopping the other machines.

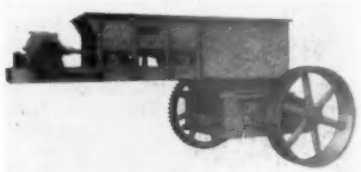


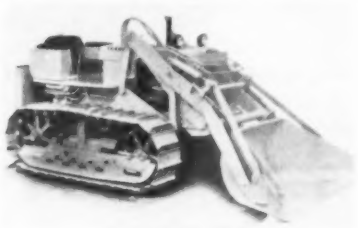
Plate feeder which employs the bottom-feed principle

Magnetic Pulley

STEARNS MAGNETIC, INC., 620 S. 28th St., Milwaukee 46, Wis., has built a permanent magnetic pulley, designed to process up to 10-in. lump-size material, at a belt speed of 300 ft. per min. with a capacity of 300 t.p.h. The pulley has a 42-in. diameter, a 30-in. crown face and a 36-in. belt width.

Digging Loader

AMERICAN TRACTOR CORP., Churubusco, Ind., has introduced the Terra-load'r, a digging loader with the bucket pivoted at the front rear cutting edge, which incorporates a hydraulic

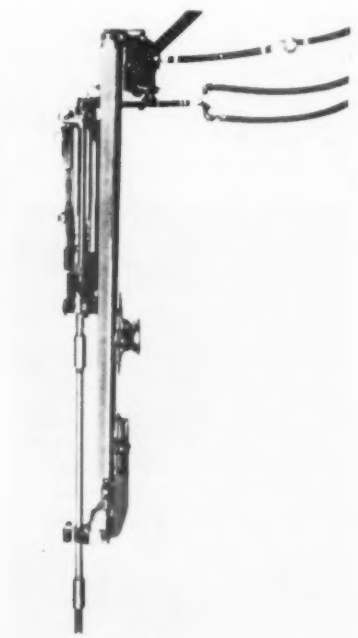


Hydraulic-lift loader

lift and control valve to permit a float position for handling of loose materials when dozing or loading. For backfilling operations, down pressure is said to insure fingertip control. The machine is available in three models: the GT-30, with a drawbar horsepower of 26.3 and is equipped with a ½-cu. yd. bucket; the GT-34, with a drawbar horsepower of 30; and the DT-34, a diesel with drawbar horsepower of 29. Both the GT-34 and DT-34 are equipped with a ⅝-cu. yd. bucket. All models have steel track shoes as standard equipment, and rubber track shoes or flat steel street plates as optional equipment.

Percussion Drill

GARDNER-DENVER CO., Quincy, Ill., has announced a percussion drill specifically designed for deep-hole drilling. Designated Model SFH99, the drill is also equipped for drilling holes in a ring drilling pattern. The shank rod is locked in the chuck to prevent loss of the rod on down holes, and an extra-heavy centralizer supports the rod string during changes. The model is equipped for reverse rotation which, together with the locked-in shank rod, permits use of the drill power for uncoupling rods with one wrench. It also is equipped with a ring seal shank for delivering air or water into the rod string at high pressure.



Deep hole percussion drill

Diesel-Electric Train

R. G. LETOURNEAU, INC., Peoria, Ill., has announced a new development by Mr. LeTourneau, called the Tournatrain, which has been built and given trial runs at the Longview, Texas, plant. The Tournatrain, which consists of a locomotive and four cars, is a rubber-tired, diesel-electric train, and requires no rails. Designed for use in desert transportation, it differs from the conventional diesel-electric train in that it has an electric motor in each wheel of the locomotive and in each wheel of the cars; all four wheels of the locomotive and the rear wheels of each of the cars are steered by controls in the cab of the locomotive; and it runs on large rubber-tired wheels. The Tournatrain is so designed that it can accommodate seven persons in the cab, including the operator, and has sleeping accommodations for two persons in the cab.

Vibrating Screen

DIAMOND IRON WORKS, INC., 1748 N. Second St., Minneapolis 11, Minn., announced production of a vibrating screen with inclined construction to maintain a high rate of production without clogging. The 5-ft. wide series is driven wich "V" or flat belt drives, and is available in 10-, 12- and 14-ft. lengths with a choice of 1, 2, 2½ or 3 decks. Four-bearing construction provides positive vibrating action, and ample headroom permits fast separation of material over the entire screening area. Heavy steel plates between the bearings give additional

Vibrating screen designed for high production without clogging

side plate strength. Also included among the screen features are double-row, roller bearings, rubber-mounted main bearing cages, adjustable spring balance cups, and screen clamp bars over the center supports.

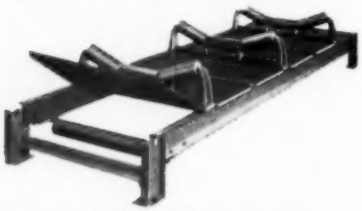
Industrial Trucks

MACK TRUCKS, INC., 350 Fifth Ave., New York 1, N.Y., has introduced the B Series line of four and six-wheel trucks, powered by gasoline or diesel engines. Chassis weight has been reduced through use of a light steel alloy to provide greater payload capacity. A short hood, bumper and radiator with the engine mounted over the front axle, reduce the distance from the front bumper to the back of the cab to permit use of maximum length trailers or to accomodate larger truck bodies. The entire engine can be exposed for servicing or maintenance, by raising the hood and detaching the side panels. The axle banjos are of a lightweight, high-strength construction. Dual reduction, two-speed axles, which drive through spiral bevels, are available as well as single-reduction axles, which drive through hypoid gears. The cabs provide operator visibility through large door windows and wide V-type windshields which are set at an angle to reduce glare. A separate, adjustable driver's seat, wing-type window ventilators and controllable cab vents, non-glare automatic aircraft-type map lights over the doors, and a detachable instrument panel are among the cab features.

Truck with greater payload capacity has optional step tank

Conveyor

TRANSALL INC., P.O. Box 1588, 158 N. 11th St., Birmingham, Ala., has developed a sectional, channel-type conveyor for semi-permanent and permanent overland and underground applications. The sections are 12 ft. long with interchangeable parts, while the idlers are permanently lubricated, using 4- or 5-in. dia. rolls. Channel side members can be furnished in dismountable or bolted construction and are mounted on the supporting chairs with a hinged connection to allow the conveyor to conform to uneven or rolling terrain. The supporting chairs have slotted foot pads for spiking to wooden cross ties or direct mounting on the mine floor. Either removable or solid protective plates can be furnished as optional equipment. For installations which will be subjected to wide temperature changes, special sections for expansion and contraction are available.



Sectional, channel-type conveyor

Fork Lift Trucks

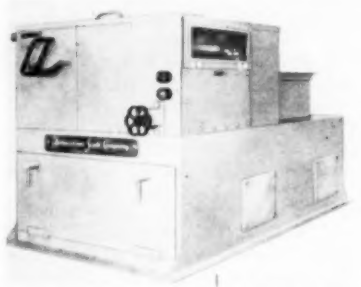
HYSTER CO., 2902 N. E. Clackamas St., Portland 8, Ore., has announced two fork-lift trucks, Models YC-40 and UC-30. The trucks are powered by heavy-duty, water-cooled industrial engines and are mounted on cushion-type tires. Compactness, durability and maneuverability are said to be features of the trucks. The YC-40 has a capacity of 4000 lb. at 24-in. load centers. Its width of 38 in. and overall length of 78½ in. permit it to operate inside boxcars and crowded quarters. A collapsed height of 82½ in. permits it to pass through ordinary doors and under low ceilings. The load can be raised 30 in. before the minimum height is affected, and ample underclearance allows safe travel over rough surfaces and inclines. The YC-40 is said to be able to climb a 20 percent grade loaded.

The UC-30 is basically the same as the YC-40, but with 600-lb. less counter-weight and a capacity of 3000 lb. at 24-in. load centers. The overall length is 74⅝ in. and it is said to be able to climb a 24 percent grade loaded. Both trucks have a sharp turning radius of 75 in., and 30 in. of free lift on the 9-ft. uprights. Other features include heavy-duty brakes, automotive-type controls, and quick-change clutches.

Fork truck of 4000-lb. capacity

Weighing Feeder

THE RICHARDSON SCALE CO., Clifton, N.J., has developed a solids feeder to provide uninterrupted flow of material to processing equipment. In operation, the feeder receives material through an inlet opening where it drops onto a conveyor belt to be carried past a regulating gate, over a scale mechanism and out a discharge opening at the feeder bottom. The regulating gate, with either a sharp or involute edge, automatically controls the depth of the material moving on the belt. A counter on the side of the feeder records in hundredths-of-a-minute the duration of any run. The unit is available in two models, one with a 9-in. stream width to handle from 75 to 1500 lb. per min.; and another with an 18-in. stream width to handle from 150 to 3000 lb. per min.



Solids weighing feeder which delivers at rates up to 3000 lb. per min.

Bucket Loader

BAKER-LULL CORP., 314 W. 90th St., Minneapolis 20, Minn., has designed its Shoveloader with a material bucket for materials loading and unloading. This hydraulic loader is available with eight accessory attachments including a bulldozer, lifting crane and a sweeper for clean-up. It is available in six models, rated by capacity, dumping height and forward reach, and is mounted on four industrial tractor makes, the Case, Minneapolis-Moline, Shepherd and Oliver. Double-acting, hydraulic cylinders are incorporated for precision load control in any direction. The loader has a forward reach of 66 to 72 in. ahead of the radiator to allow trucks, hoppers and bins to be loaded from one tractor position, and features a design enabling the bucket to be shaken clean by the operator. The unit is engineered to crowd and dig below the tractor level.

Materials-handling, hydraulic bucket loader

Hydraulic Control Hose

H. K. PORTER CO., INC., Quaker Rubber Div., 1932 Oliver Bldg., Pittsburgh 22, Penn., has developed a line of high-pressure, hydraulic-control hose. It is said to be capable of withstanding pressures up to 5000 p.s.i., and is reinforced with high tensile steel wire to give the hose flexibility at temperatures from 40 to 250 deg. F. and burst resistance under shock loads. Especially designed for use on earth moving equipment, industrial trucks, machine tools, etc., the hose is available in both high and medium-high pressure in sizes from $\frac{3}{16}$- to 2-in. inside diameters. The rubber tube is compounded to resist hydraulic fluids and the cross-wrapped, rubber cover protects against weather, mildew, oils, greases and fumes. It is also available with a rubber-impregnated, cotton braid cover.

Pyrometer Controller

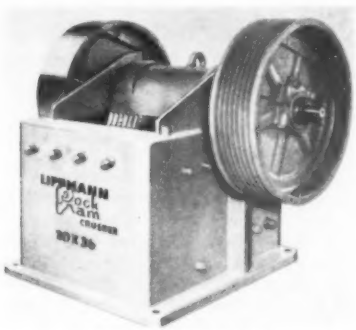
THE BRISTOL CO., Waterbury 20, Conn., has brought out its line of free-vane electronic pyrometer controllers. Their purpose is to actuate relays, electric contactors, solenoid and motor valves to provide close temperature control for furnaces, kilns, ovens, etc. The electronic control is based on the frequency modu-

Electronic controller with plug-in construction

lation principle, and features a millivoltmeter mechanism and unit plug-in construction. The basic model can be used for low-open, high-open and low-high control, while a double control-unit model provides low-open-high or low-normal-high control. Temperature ranges for the units are 0-400 deg. F. to 0-3000 deg. F.

Jaw Crushers

LIPPMANN ENGINEERING WORKS, 4603 W. Mitchell St., Milwaukee, Wis., recently announced a line of jaw

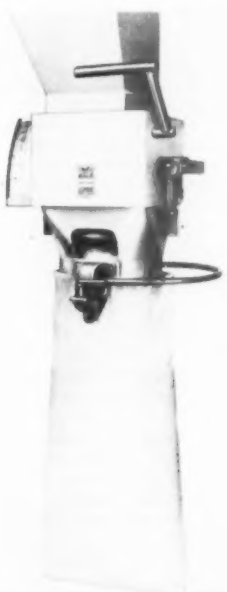


Improved jaw crusher

crushers to be known as the Lippmann Rock-Ram. The machine is a fabricated type and contains the same mechanical features as the Grizzly-King crusher. The new line will be available in sizes of 10 x 16, 10 x 20, 10 x 24, 10 x 36, 15 x 36, 20 x 36, and 30 x 36 in.

Weighing Bagger

RICHARDSON SCALE CO., Clifton, N.J., has developed a hand-operated, gross weighing scale which weighs



Hand-operated, gross weighing scale and bagger

and fills textile or multi-wall bags with bulk materials such as agstone, fertilizers, etc. The material flow may be observed through a hand hole in front of the bag spout. The gross bagger has an automatic cut-off system which shuts off the flow when the bag is within 4 lb. of being filled. After the cut-off point, the operator can dribble material into the bag until the exact weight is reached. To release the filled bag, a semi-circular bar of the gripping mechanism is nudged and the cam grip is released. A scale indicator on the side of the bagger, which is sensitive to 0.5 oz., checks the bag weight. The gross bagger differs from a net bagger since the bag attached to the spout acts in place of a weigh hopper. Either 50-, 80-, 100- or 140-lb. open-mouth bags may be handled.

Air Conditioning for Crane Cabs

LINTERN CORP., Route 20, East, Painesville, Ohio, has introduced two air conditioning units for cabs on traveling cranes operating in temperatures up to 115 deg. and 140 deg. F. Both units have been applied in cement and industrial plants, while a larger Aire-Rectifier, for temperatures up to 180 deg. F., is used where temperatures are excessive. In crane cabs operating in temperatures up to 180 deg. F., the larger unit is said to provide a working condition temperature of approximately 80 to 85 deg. F. For cranes operating in lower temperatures, either of the two smaller units provide the necessary cooler temperatures.

Automotive Type Cranes

THE THEW SHOVEL CO., Lorain, Ohio, has added models MC-524 and SP-524 to its line of cranes. Model MC-524 has a 30-ton capacity turntable, mounted on an automotive type, three-axle carrier with ten speeds forward and two reverse. Both gasoline and diesel power are available for the machine, which can travel at speeds up to 30 m.p.h. with double rear axle bogies to aid travel over soft or rough ground. The carrier can be provided with two rear driving axles or with an additional front

Thirty-ton capacity crane mounted on three-axle carrier

driving axle. It is convertible to a shovel, crane, clamshell, dragline or hoe.

Model SP-524, built for more limited travel, has the drive on only two axles and operates with four speeds in both directions with a travel speed of 7½ m.p.h. This model is available as a crane and dragline only.

Overall widths of the MC-524 and SP-524 are 120 in. and 123 in., respectively. Both machines have booms which can be extended to 100 ft. with an additional 25-ft. extension; a floating harness for 8-part reeving of boom hoist cable; and a telescopic type gantry for long boom operation.

Hydraulic Scrapers

EUCLID ROAD MACHINERY CO., Cleveland 17, Ohio, has announced three additions to its line of scrapers. A 15.5-cu. yd. model, an 18-cu. yd. twin-power unit, and a 12-cu. yd. scraper feature a "lever-action" design used with a hydraulic system. The lever arrangement and vertically mounted jacks, which are incorporated in the torque tube, provide a lower height for top loading with shovels and draglines. Two lever-action hoists raise the bowl to a maximum height of 28 in. while the apron is lifted by a hoist and lever connected by the only cable used in the scraper. Additional features are hydraulic booster steering; planetary type, double reduction drive axles; and independent scraper control.

Lever-action scraper featuring single-stage hoists

End view of H.M.S. plant; at top is a 4- x 10-ft. vibrating screen, to the right is the densifier, and to the left is the 5- x 16-ft. screen

HIGH QUALITY AGGREGATE

from Rejected Material Treated by H.M.S.

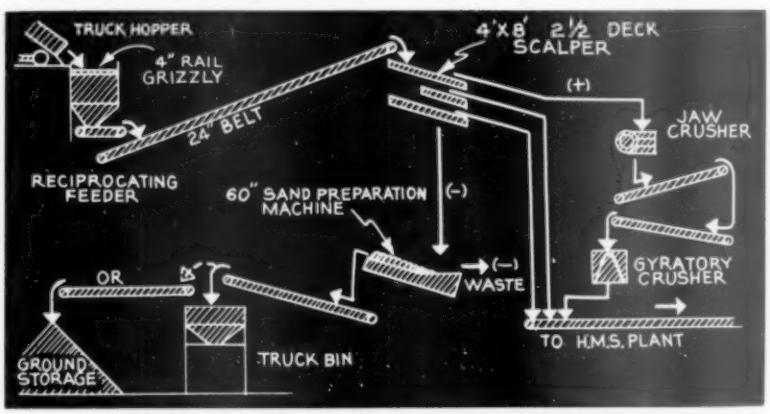
Owatonna Aggregates Corp., Owatonna, Minn., constructs sand and gravel plant with heavy media separation section for the removal of deleterious materials

By WALTER B. LENHART

OWATONNA AGGREGATES CORP., Owatonna, Minn., has the distinction of being the first sand and gravel producer in the United States to use heavy media separation in a land-based plant.*

Owatonna, Minn., is a town of approximately 11,000 population, about 75 miles south of Minneapolis and St. Paul. The cities and town surrounding the area include Rochester some 40 miles east, Faribault to the north, Mankato to the west and Albert Lea and Austin to the south. It is a rich agricultural section, but until the advent of heavy media separation most of the concrete aggregates had to be shipped into the area. Surrounding Owatonna are islands of glacial sand and gravel deposits that have been processed over the years The material was of such a mineralogical composition that it could not meet reasonable specifications. When the gravels were used in concrete it was for such non-exposed work as foundations, footings, etc.

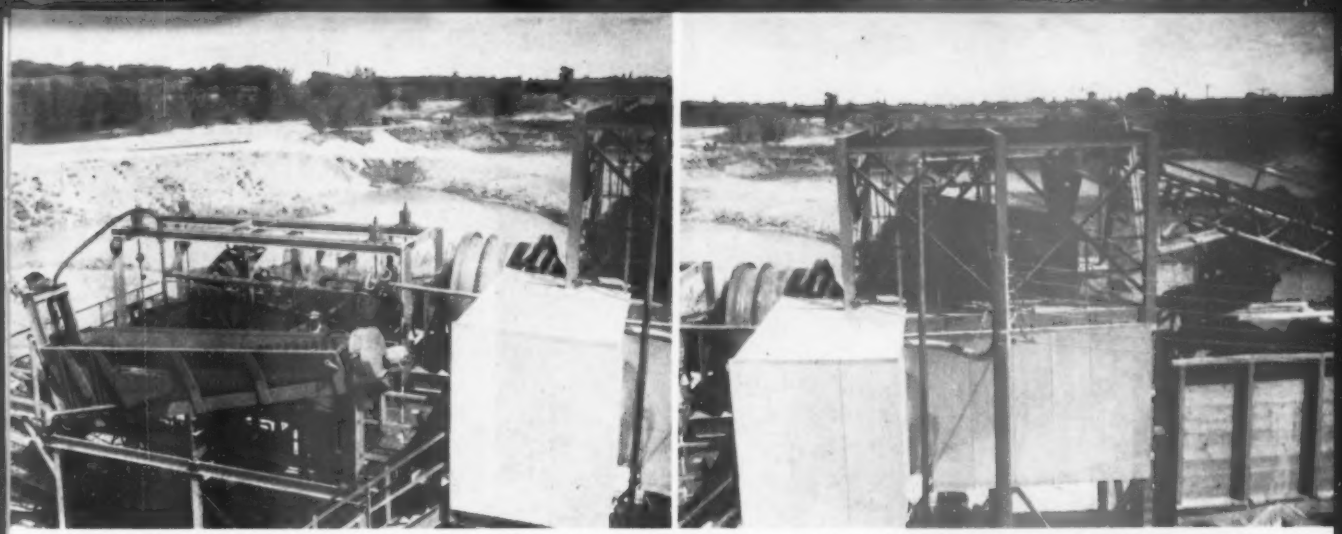
Gravel deposits being worked by the Owatonna Aggregates Corp. are located at Medford, Minn., 8 miles north of Owatonna. They are relatively shallow with variable but small amounts of overburden. The gravel is relatively small in size with color ranging from white through yellow, browns to jet black. The pit run material contains soft and hard limestone, shales, iron oxide, granites, trap rock, etc. The Twin Cities Testing and Engineering Laboratories describe the gravel as "Composed of about equal parts of igneous rock of the intrusive variety (granite, syenite and diorite) and extrusive igneous rock (felsite and basalt) and sedimentary limestone with minor amounts of sedimentary sandstone, metamorphic quartzites and others." The material ranges from angular and sub-angular to well rounded pieces. Some clay-balls are present in the pit-run but are removed by the heavy media processing. The iron oxide particles are classed as limonite. This is a secondary iron mineral, originating mainly from circulating ground waters, so that any of the above mentioned rock-types can become coated with a shell of red-brown iron oxide thereby resulting in a rock having a specific gravity range from



Flowsheet of operations preceding heavy media separation plant

Preliminary plant equipment ahead of H.M.S. section, center, jaw crusher to the right, and 4- x 8-ft. scalper screen at the top

*Dravo Corp., Pittsburgh, Penn., was the first to use heavy media separation on a dredge operation. The plant was described in ROCK PRODUCTS, April, 1953, p. 96.



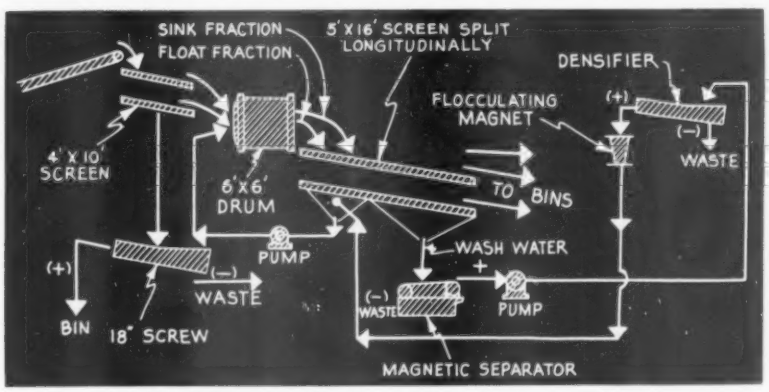
Side view of H.M.S. plant. In the center, background, may be seen the separatory drum; to its left is the 5- x 16-ft. screen; in the left, foreground, is the densifier; the illustration to the right shows the 4- x 10-ft. wash screen ahead of the drum with the 18-in. sand screw under belt conveyor

heavy to light, depending on the type of rock that had been coated with the iron oxide. However, limonite has no deleterious effect on concrete as regards strength or durability, but its presence can result in staining exposed surfaces. However, the amount of iron oxide in the Owatonna deposits is small and most of that present is removed in the H.M.S. plant. The bad actors in the Owatonna aggregates are the shales and softer porous rocks. These have a relatively low specific gravity as compared to the bulk of the raw material and therefore lend themselves to H.M.S. processing.

The pit-run Owatonna aggregates, when used in concrete, result in surface disintegration to a remarkable degree. The appearance of older streets and sidewalks in the city attest to this fact. On flat work the lighter portions of the aggregate tend to float to the surface and being porous, hold entrained water in the pores of the stone. Later freezing of the pavements result in "pop-outs" which in one season makes an unsightly floor. The mass of the concrete itself does not seem to be unduly affected—only the surface. This condition soon became apparent to constructors in the area so for the past 10 years or more most of the aggregates used for exposed concrete in the area were shipped in from outside sources.

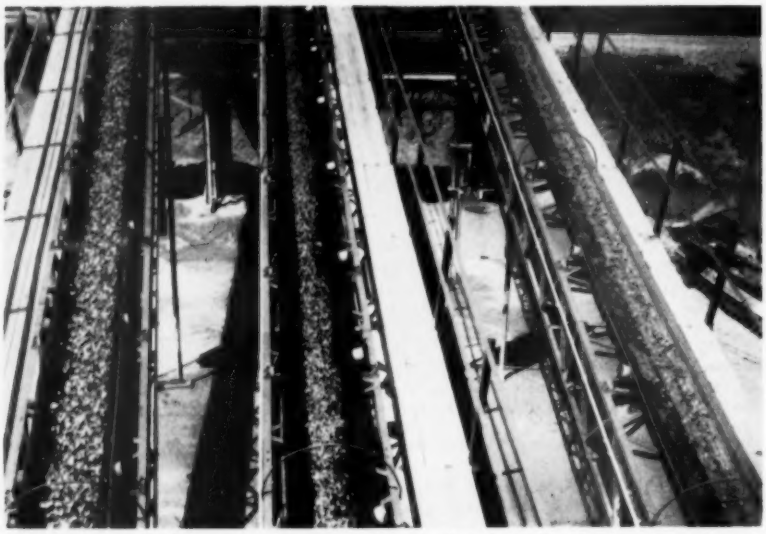
Having available relatively large areas of local gravel, the Owatonna Aggregates Corp. (formerly the Owatonna Cement Tile Co.) attacked this problem and from 1928 to date ". . . tried everything . . .". The Owatonna Aggregates Corp. has a fluorishing concrete drain tile plant in Owatonna, and, at the pit near Medford, have a neat and busy Besser-equipped concrete block manufacturing plant. Officers of the company are also financially interested in a ready-mixed concrete plant near the pit making the company itself a considerable consumer of gravel. The block and tile plants alone use 90 to 100 cu. yd. of minus ⅜-in. material per day. The deleterious particles in the plus ⅜-in. minus 1½-in. material caused the most trouble in poured concrete. As producers of gravel that could not be used, except for limited purposes, this situation constituted a challenge. The company turned to heavy media separation as the answer, and are pioneering its adaptation to a complex aggregate.

The Owatonna Aggregates Corp. is owned and operated by E. W. Hammel, his brother L. S. Hammel, Donald Hammel, L. W. Hammel and Charles Hammel. E. W. Hammel is president of the company. Donald Hammel, son of the president, is acting as plant manager for the block and aggregate plants. L. W. Hammel, the son of L. S. Hammel, is office manager. Charles Hammel, another son of L. S. Hammel, is in charge of the heavy media separation and gravel plant. These five men, working together, have built up a prosperous and well established group of rock products enterprises. Possibly their



Flowsheet of processing and equipment in heavy media separation plant

Bins to the right, served by three belt conveyors, receive the "float" product and the two "sink" materials. The H.M.S. plant is in the center, background



Belt conveyor, to the left, carries the coarser "sink" product; the center belt has the finer "sink" material; and the belt, to the right, carries the "float" portion

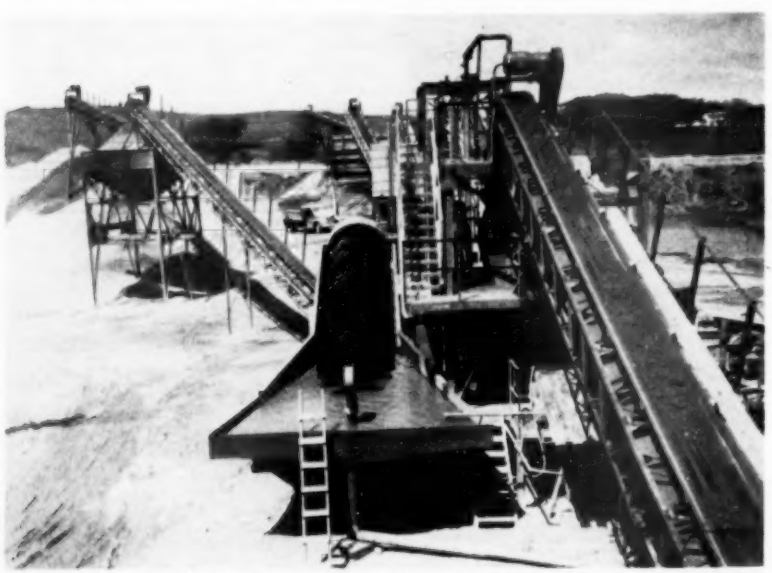
leaning towards modern processing stems from the fact that L. W. Hammel is a geologist and Donald Hammel is a mechanical engineer. All residents of Minnesota also are quite conscious of the tremendous work going on in the "iron range" to the north where heavy media processing is playing its part in treating low grade taconite iron ores.

The heavy media separation process† (referred to generally as the H.M.S. process) is a method whereby minus 1½-in. and plus ¼-in. rock are introduced into a heavy pulp or "media." The lighter fragments float and the heavier sink thereby affecting the separation. The media used is made up of finely ground magnetite, or ferrosilicon, or a mixture of the two. These, when suspended in water, make a non-settling pulp which can be built up from a (plus) 1.0 sp. gr. to one in the 3.4 sp. gr. range. By adjusting the specific gravity of the pulp to correspond with the materials to be separated, the process can be easily applied. Magnetite and ferrosilicon, being magnetic are easily and cheaply recovered in the process.

There seems to be in the rock products industries a considerable divergence of opinions on the adaptability of the process. Some say it is too costly. This is not generally true. Reports of operations are available where the H.M.S. process is in use with total field costs as low as 4 cents per ton. Several report costs up to 10 cents. While these costs may appear high, they are relatively insignificant when freight rates are one dollar or more per ton. In a like vein, some say the process is of limited capacity. Here again this is not always true. The H.M.S. plant capacity is like the size of the shovel used in the pit. If a larger loading capacity is desired, a larger shovel can be obtained. And so it is with H.M.S., the size of the plant is the main item governing its capacity.

To describe in detail, a H.M.S. plant introduces new terms to the producer and the description can sound very complicated. The introduction of such terms as "densifier," it is simply a short inclined screw conveyor or classifier, lends ambiguity to the written word. Pile on top of this such terms as "flocculating coils," "de-flocculating magnet," and "magnetic separators," and the confusion to some becomes nearly complete. However, the H.M.S. plant is quite simple in its operation. The plant of the Owatonna Aggregates Corp., designated as a No. 3M Mobile-Mill, was supplied by the Western Machinery Co. of San Francisco, Calif. It uses a 6- x 6-ft. drum-type separator that will be described later. The plant covers a floor space of roughly 20 x 30 ft. with most of the equipment being on an operating deck about 12 ft. from the ground. The term "Mobile-Mill" is derived from the fact that the plant is mounted on heavy steel skids and can be moved in segments. The prefabricated H.M.S. plant was erected with a crew of six men in about a week. It takes one man to run the plant and uses a total of 54 hp. and has a capacity of 50-75 tons per hour of coarse aggregate. The main duty of the lone operator is to take half-hourly specific gravity readings to keep the specific gravity of the pulp at the desired point. Lubrication and general watchfulness are his other duties.

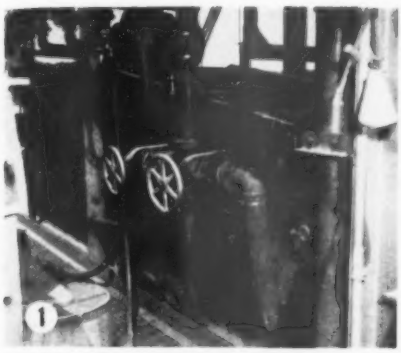
†Basic patents for the H.M.S. process are controlled by the American Cyanamid Co. A small royalty is charged for the use of the process. Western-Knapp Engineering Co., designed the H.M.S. plant.

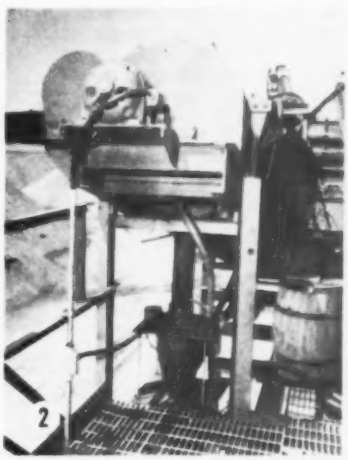


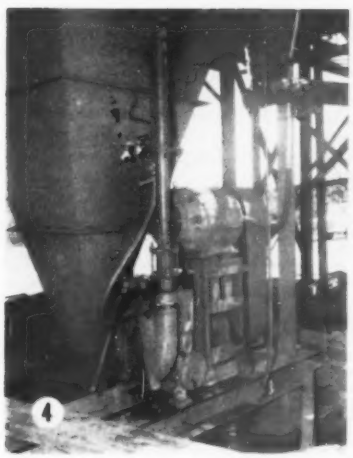
The 60-in. sand preparation machine recovers the natural sand

H.M.S. Processing Costs

A mixture of 60 percent magnetite and 40 percent ferrosilicon is used, and a consumption of one pound per ton of drum feed is indicated. The ferrosilicon is purchased in 500-lb. wooden kegs at Keokuk, Iowa. It is ground dry to 65 mesh. The company hauled one truck load from Keokuk which is expected to last about two months. Ferrosilicon costs $130 per ton, f.o.b. Keokuk. The magnetite is secured from Aurora, Minn., and costs $25 per ton f.o.b. shipping point. It was hauled in bulk to the plant in the company's truck and is ground wet to about 100 mesh. Both are jet black in color. On the basis of a 60-40 mix, the cost of the media is 3.35 cents per pound. A loss of one







Close-ups of some of the H.M.S. plant equipment. (1) Pinch valves alongside screen control volume of wash water and media going to separatory drum. (2) Demagnetizing or flocculating magnet under the discharge end of densifier. (3) Belt-type magnet which recovers the magnetite-ferrosilicon mixture which is delivered to the densifier by the sand pump. (4) Pump which delivers media from cone under rinse (and drainage) screen to the separatory drum. (5) Final 5- x 16-ft. screen with split deck, showing "float" portion to the left, and the "sink" material to the right. (6) Vertical pump that delivers media from the "make-up" sump to the H.M.S. system. This pump is only used when additional media is necessary; the coned section is below the final screen from which it receives drained media

pound per ton of material treated will depend upon the recovery of magnetics in the magnetic separator and the loss of media that is not completely washed from the stone. At Owatonna 95 percent of the rock sent to the H.M.S. plant is recovered as specification material and 5 percent as non-specification which, however, can be sold for non-concrete uses. Hence the media, or reagent cost is by far the highest cost item and at Owatonna a cost of about 3.5 cents is indicated.

How It Operates

The 6- x 6-ft. drum-type separator is the invention of Ralph Utt, general manager of Western-Knapp Engineering Co., the affiliate of Western Machinery Co. The drum revolves at 4 r.p.m. in a horizontal position and on suitable trunnions, and is kept overflowing full of media. The rock is introduced into the revolving drum, the heavier particles sink and are picked up by lifters, and the material is discharged through a chute at the opposite end of the drum. The "float" portion simply floats out the same end of the unit. The drum-type separator has a relatively high capacity when compared to the cone-type separator. This latter type of separator was described fully in ROCK PRODUCTS, February, 1953, page 89 in connection with its use at the Natividad operations of Henry J. Kaiser where friable granite was being separated from dolomite.

One of the essentials of adequate processing by H.M.S. of gravel (or other rock) lies in the preparation of a thoroughly washed and scrubbed gravel before it is introduced into the H.M.S. separatory vessel. Gravels coated with clay can result in a high media loss due to the media clinging to the poorly washed rock. Porous rocks if not thoroughly pre-wet can have a suction action pulling media into the core of the rock with a resulting possible loss. Clay balls, of different specific gravity than the gravel, can be removed easily by the process. It was indicated that at Owatonna the loss of media clinging to the clay balls was not a significant figure—this loss would depend on the percentage of clay present. At Owatonna the amount of clay in the feed is small, but the removal is complete as indicated by test data.

The following tabulation gives the essential characteristics of the predominating ingredients of the Owatonna gravels:

	Specific Gravity	Absorption
Shales	1.85	26.5 percent
Limestone (soft)	2.19	10.0 percent
Iron Oxide	2.48	21.7 percent
Limestone (hard)	2.64	3.2 percent
Granite	2.65	0.4 percent
Trap rock	2.84	0.5 percent

Test Results

The media is kept at a specific gravity of 2.50 to 2.55. The feed to the system is all plus ⅜-in. and minus 1¼-in.; a mixture of crushed and uncrushed gravel. Test results indicate that all the clay balls are removed and only a trace of the shales remain. There is no coal or lignite in the finished material. The iron oxide content is reduced below A.S.T.M. specifications and other soft rocks are reduced to 0.5 percent and A.S.T.M. specifications require less than 1.0 percent for 1½-in. to plus 4 mesh, and ¼ percent for the 1-in. to No. 4 mesh. As the H.M.S. plant is still in the early experimental stages the operators are confident that the installation will come up to expectations. The "float" portion or rejects represent about 5 percent of

Metal flask in foreground next to separatory drum holds one liter of media. By weighing it, the sp. gr. of the media is quickly obtained

the total feed to the drum and contains around 75 percent soft rock and 25 percent shale and iron oxide. The sodium sulphate soundness tests on the finished aggregate are well below A.S.T.M. specifications.

Sand and Gravel Plant

The sand and gravel plant of the Owatonna Aggregates Corp. is essentially new, having been put in service early this Spring. It consists of a 4- x 8-ft. Tyler 2½-deck scalping screen, operated wet. Oversize is crushed in an older jaw crusher with an Allis-Chalmers No. 636 gyratory as a secondary crusher. Sand is recovered in a 60-in. Wemco sand preparation machine ahead of the crushing so that no crushed soft stone and shale fragments get into the finished sand. The two crushers operate in series and the end product from the final crusher, No. 636, and the throughs from the intermediate decks of the scalper are sent to the H.M.S. plant by an inclined belt conveyor. All conveyor belts are Goodyear, and are 18-in. wide with the exception of the 24-in. belt that receives its feed from a Pioneer reciprocating feeder under the truck hopper serving the plant. Link Belt Co. supplied the prefabricated conveyors.

At the H.M.S. plant, the material passes over a 4- x 10-ft. Allis-Chalmers, double-deck vibrating screen and is given a second thorough washing. The minus ⅜-in. crushed sand from the lower deck falls to an 24-in. Eagle sand screw and this sand is sold for miscellaneous non-concrete uses. It is small in amount. Water from the Eagle sand screw is wasted. The remaining screen products go into the separatory drum.

The "sink" fraction and the "float" fraction from the drum both discharge to the same vibrating screen. This 5- x 16-ft. Allis-Chalmers, double-deck, low-head screen is divided longitudinally into two sections. One section, about 12 in. wide, carries the "float" portion. The 4-ft. remainder of the screen width is used for the "sink" fraction. Heavy water sprays near the top of the screen, and between its decks, wash off any entrained media. The screen also separates the finished product into two sizes; ⅜ in. to ⅝ in.; and ⅜ in. to 1¼ in.

Media Recovery

On the screen, following the H.M.S. drum separator, most of the media drains to a cone-shaped sump below where a Wemco sand pump picks up the media and returns it to the separator. Wash water from the screen, with its entrained media, flows direct to a Dings belt-type, magnetic separator which recovers the magnetic magnetite and ferrosilicon which is then pumped to the 16-in. densifier located on the top deck paralleling the long screen. The Wemco spiral densifier is used to feed back to the system the media recovered at the magnet. By raising or lowering the tail end of the spiral, the feed can be decreased or increased as desired.

As the media discharges from the densifier it passes through a "demagnitizing", or "de-flocculating" coil. This is a small stationary coil with the pipe line passing through its core. The purpose of the coil is to restore the media to its non-settling characteristics which were partially destroyed when the media previously went through the belt-type magnet. This type of installation differs slightly from those previously described in ROCK PRODUCTS in that there is no flocculating magnetic coil or a thickener storage for the wash waters. Here the wash waters go direct to the belt-type magnet. On the ground floor is a small vertical pump that serves a small sump alongside it. When it is desired to add more new magnetite or ferrosilicon to the circuit, it is washed to the sump and then pumped into the circuit by the vertical pump. The H.M.S. plant uses G. E. motors throughout. In the pipe lines handling media, Massco-Grigsby pinch valves are used. The pinch valves are made by The Mine & Smelter Supply Co., Denver, Colo., and are an economical system of controlling abrasive flows of pulp. The H.M.S. plant is of steel construction throughout and operates with cover only over the control panels.

Three inclined belt conveyors finger out from below the final screen carrying the two finished sizes and the non-specification float portion to storage bins. A blend of the two specification sizes can also be made. This bin, (and the sand bin) are so designed that when they are full, the overflow automatically falls to an off-bearing belt and, in the case of the sand, is ground stored. The aggregate is loaded to open top gondolas. The entire plant has a connected load of 220-hp. and

An example of concrete made with the old aggregates containing shale and porous gravel before processing by H.M.S. was available. Note pop-outs and discoloration

This 18-in. screw recovers sand from the crushing operation and keeps it out of the H.M.S. circuit; sand is also kept separate from natural sand

has a capacity of 125 to 150 t.p.h. of feed. The plant is located adjacent to tracks of the Chicago, Milwaukee, St. Paul and Pacific railroad.

Water for the plant is secured from a pond alongside the operation using a 6-in. Allis-Chalmers centrifugal pump. Ground stored material is reclaimed by a 1-cu. yd. American clam-shell equipped crane augmented by a Lull front-end loader.

Loading in the pit is by means of a $\frac{3}{4}$-cu. yd. American Hoist & Derrick Co. dragline with transportation to the plant by a fleet of four Diamond "T" rear-dump trucks. The haul is about 300 yd. over easy grades.

Block and Ready-Mix Plants

The block plant, adjacent to the H.M.S. operation, uses a Besser Vibropac and has two Erickson lift trucks. Trucks deliver aggregate via a ramp direct to the bins. Bulk cement is used. The block plant operates under the name of the Owatonna Concrete Products Co.

Alongside the block plant is the Steele-Rice Ready Mixed Concrete Corp. plant which is a joint venture of the Hammel family and others. It uses Blaw-Knox bins and weigh batchers, and has four Blaw-Knox mixer bodies mounted on International chassis. The company derives its name from the fact that it is located almost at the boundaries of Steele and Rice counties and serves both the towns of Owatonna and Faribault and surrounding areas. The offices and concrete tile plant are in Owatonna. The tile plant is located along tracks of the Rock Island Railroad.

Rocky's Notes

(Continued from page 39)

projects on the fundamentals of both clay and portland cement.

The chief, if not the whole, benefit from calcining a clay for pozzolan appears to be in driving out all the free water, and at least some of that which is present in the clay minerals as OH bonds. When calcination is carried beyond this point, apparently enough mobility is given the electrons surrounding the various elements, mostly silicon and aluminum, to form new mineral crystals. Thus, one may reason that merely drying out the clay, which may include some of the moisture that has been hydrolyzed to form OH and H bonds, frees the surfaces of the silica and alumina particles for fresh chemical activity. As long as these surfaces are occupied by water molecules and OH and H ions, they will have little or no activity with the ions of anything but water soluble elements or compounds. Lime being only slightly soluble, its reaction with the raw water-soaked clay would naturally be little or nothing. But, with the clay's pores and capillaries dried out, some lime solution (as calcium ions) will enter the clay structure, or possibly as calcium hydroxide colloids. The chemistry of this reaction should not be so difficult to fathom—and it may point the way to the chemistry of cement setting and hardening.

Research Methods Employed

Returning now to the book we set out to review, we find the paper by Dr. Ernst A. Hauser on the "Genesis of Clay Minerals" of very particular interest because it contains the basis of his theories on colloid science as applied to silicate minerals. We have referred before to some of Dr. Hauser's work because he always emphasizes that the problems of silicate chemistry will never be solved by chemistry alone; and he always deplores the lack of interest by chemists in the possibilities of colloid science. While he has not yet discussed portland cement as a typical silicate, so far as we know, it is obvious that he could do so, with profit to cement and concrete researchers. As to methods of research on siliceous matter he writes: "From an experimental point of view, the colloid chemist has had at his disposal various possibilities for learning more and more about the composition, morphology, and structure of siliceous matter by applying to his investigations x-ray diffraction, ultramicroscopy and electron microscopy, electrophoresis, differential thermal analysis, infrared spectroscopy, and many other modern tools of research." These terms and methods are familiar [and probably are being experimented with] to true cement and concrete researchers, but probably the majority of alleged concrete researchers who most frequently break into print are not only unfamiliar with the use of these research tools, but apparently fail to appreciate the necessity of getting at these fundamental physical-chemical data to solve the problems of concrete.

Part of one paragraph of Dr. Hauser's paper bears quoting because it illustrates why ordinary chemistry will not supply the answers in concrete research. He writes: "Clays owe their genesis to the presence of silica and alumina or magnesia gels, and the changes they undergo with either time or temperature. Fairly recent studies on the formation of clay minerals have offered further proof for the validity of this theory. Another fact that until recently has not found the attention it deserves is that, in spite of the inertness of most siliceous matter, the chemical reactivity of the silica surface surpasses that of most stable oxides. Systematic research on the surface chemistry of silicates has led to the discovery of unexpected chemical reactions, which result from the dehydration or polymerization [that is, the formation of aggregates] of silicic acid. Most important of all is the release of atomic oxygen even at room temperature and the fixation of nitrogen as ammonia at temperatures ranging between 250 and 350 deg. C. What is of particular importance and so far has not been given the attention it deserves is that the temperatures and pressures that the average chemist considers essential for certain chemical reactions can be drastically reduced if adsorption of gases or dissociated ions in a liquid medium is possible. In this respect the silicates deserve special attention, because their unbalanced surface ions will act as adsorbents, bring the reactants closer together, and also increase the probability of electron transfer essential for the formation of new chemical compounds."

If we were to substitute cement paste for clay, and silica and alumina or *calcium hydroxide* gels for the ones he refers to, we might be on the way to finding out what takes place when portland cement paste is hydrated and hardens. Scattered through concrete research literature one will find many observed experimental facts that illustrate these very properties. For example, it has been found that freshly crushed Ottawa silica test sands appear to contain more air on storage than when fresh, or in air-entrainment experiments to retain more air when aged. According to the statement above, by Dr. Hauser, this could happen from the release of atomic oxygen from the fresh surfaces of the silica; or presumably it might happen by the adsorption of atomic oxygen or nitrogen from the atmosphere, or of molecules of water vapor from the atmosphere: of course, atomic oxygen does not exist in the ordinary atmosphere (it is present as O_3), but it seems possible that either the release of atomic oxygen from a silica surface, or the adsorption of single ions or atoms by the exposed oxygen ions on the silica surface from the atmosphere, could result by the immediate joining of two atoms, or the division of an atmospheric oxygen molecule, as the case might be. In either case, the end product would be the union of two oxygen ions to form an oxygen molecule.

In any event, the apparent ease with which an atom or ion oxygen appears to be released from a fresh surface of silica could account for the combinations of silica and lime or one of the alkali hydroxides, for thus could readily be rearranged the oxygen ion packing so as to provide the 6- or 8-coördinations required for most silicate oxides containing calcium and the alkalies. It could also account for the joining up of the silica tetrahedra to form aggregates. All these phenomena are examples of surface chemistry, which we expect to go into in more detail in subsequent articles of our series on "Prospective Chemistry of Cement and Concrete."

Buys Limestone Property

BETHLEHEM LIMESTONE Co., Bethlehem, Penn., is extending its quarrying operations near Hanover, Penn., by the acquisition of a 159-acre tract adjacent to its present limestone quarry. This is the third addition to its limestone property.

The most recent kiln installation

Southwestern Portland Cement Co., has increased raw mill grinding production 30 percent at Victorville, Calif., plant since the installation of liquid cyclones in the grinding circuit

From Open to Closed-Circuit GRINDING With Liquid Cyclones

THE SOUTHWESTERN PORTLAND CEMENT CO. was one of the first cement companies to install the Centriclone classifier in the raw grinding circuit. ROCK PRODUCTS feels fortunate to here, for the first time, publish performance data relating to this wet grinding technique.

The Centriclone classifier belongs to the family of liquid cyclones, but differs markedly in dynamic pattern. The initial velocity of a conventional cyclone, which uses a pump, is usually in the 10 to 20 f.p.s. range and seldom exceeds a practical limitation of 30 f.p.s. The Centriclone maintains a peripheral velocity of 75-90 f.p.s. on the average with 120 f.p.s. in some cases. The classification in all cyclonic devices results from the multiplication of gravity by the rapid increase in r.p.m. and resultant angular velocity towards the smaller orbit of overflow where the force is a maximum. The calculation of Times G at the point of maximum r.p.m. is influenced by viscosity, density, flow rates, etc. but is many times the force at periphery.

Besides operating in a very much higher velocity range, the Centriclone classifier differs from the conventional liquid cyclone in having no vacuum at the apex, but fills the vacuum column with the overflow pipe and discharges sands from an apex cylinder under pressure. This is a major factor in maintaining the minimum percent water differential between overflow and underflow. With a vacuum, the sand fraction would be lower in water, hence the overflow much higher in water. This could be compensated for only by higher density of feed which further complicates classification.

The method of withdrawal of overflow and underflow portions and the speed range, which would be quite impractical using a pump, are the major differences between Centriclones and other liquid cyclones.

During the past five years ROCK PRODUCTS has published considerable data on various liquid cyclones which were all used essentially as scavenger units to recover added fine sand in the minus 65 to 325-mesh range in sand and gravel and phosphate operations, usually handling dilute pulps in the 3 to 10 percent range. At the high velocity of the Centriclone, overflows on feeds of this density are sub-sieve micron range products, and minus 325 to minus 200 mesh products are obtained with feed densities of 20 percent to 40 percent solids. The majority of Centriclone installations are on sub-sieve sizings.

This is the first time that comprehensive data has been published in ROCK PRODUCTS on the Centriclone although brief mentions have been made of it in past issues. The Victorville installation is separating oversize from a thick pulp or slurry. In this instance, the pulp is from ball mill discharges and the unit is making the separation required without dilution.

Electric motors driving raw and finish grinding mills, all in a single row

Change From Open to Closed-Circuit Grinding

The Victorville plant had operated an open-circuit system for raw materials, and the Centriclone made it possible to change over from open-circuit to closed-circuit grinding without elaborate plant changes and at moderate cost.

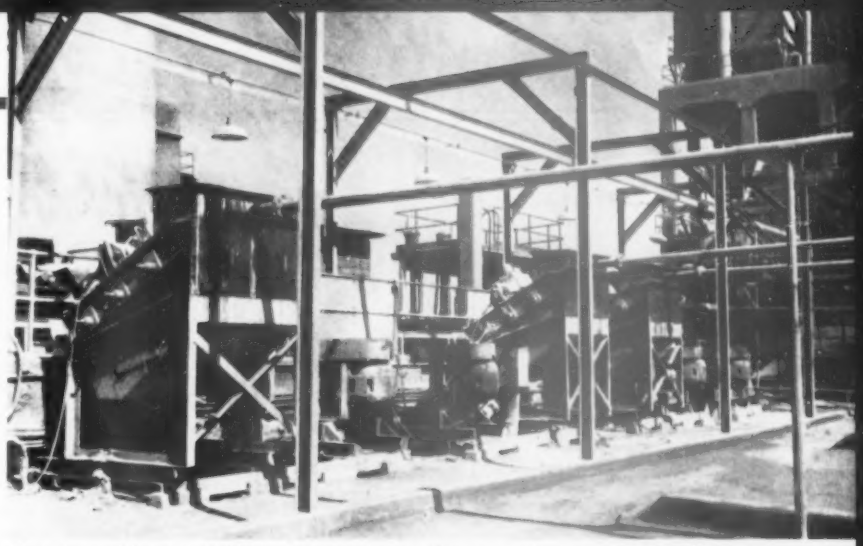
The Centriclone receives its feed by gravity. In the unit, the pulp is received by an impeller or runner that resembles an open pump impeller. The vertical shaft of the run-

ner extends through the top of the cyclone through suitable glands into a housing with vacuum seal expeller and glands above. The impeller imparts a centrifugal motion to the pulp. Under this force the coarse fractions work to the outside and downward in the swirling mass and are ejected at the base of the cone through an outlet. The finer fractions are withdrawn through a centrally located "standpipe" or "riser." The runner nominally operates in the 900 to 100 r.p.m. range and at this speed develops the equivalent of 200 times the force of gravity (200 G's). The volume of pulp going to the Centriclone is in the 125 to 150 g.p.m. range.

The flow-diagram gives the essentials of a typical installation at Victorville. There are four Centriclones in use, but a spare cyclone is kept on hand in the event a change is necessary as it does not take too long to install the spare. During the change-over the ball mill can operate in open circuit with a screen.

Another illustration shows one of the 7- x 26-ft. Allis-Chalmers mills in the raw grinding circuit. The discharge from this two-compartment wet mill is picked up by a 3-in. Wilfley pump and the material elevated to a 4- x 5-ft. Hum-mer screen located on the roof of the mill building directly above the raw grinding mill. The screen has 16-mesh or 30-mesh slotted cloth. The mesh of this screen is a subject for some current experimental work directed at a finer screen size. No wash water is used on the screen. Less than 1.0 percent of the total is plus 16 mesh which is piped back to the feed end of the ball mill. The minus 16 mesh from the Hummer flows into the Centriclone. The coarse fraction separated in the Centriclone is returned to the feed end of the ball mill, and the fine fraction is picked up by a Wilfley pump and sent to the kiln feed storage tanks. The finished slurry from the four Centriclones is picked up by two 4-in. Wilfleys and sent to the blending tanks, then to storage, and finally to the kilns. There is no dilution of the ball mill pulp, but in any extended operating time period there is some dilution that stems from washing out tanks, occasional use of small water jets to prevent line stoppages where the material might cause a line plug, and similar minor water uses. The Centriclones are designated as Size C-20; i.e., 20 in. in diameter. Each uses a 25-hp. motor that operates at 1800 r.p.m. and power is applied through "V"-belts.

In the raw grind circuit, before the use of the Centriclones, there were four 7- x 26-ft. Allis-Chalmers, two-compartment, Compeb mills, and one 7- x 40-ft., three-compartment mill. The Centriclones permitted the elimination of one 7- x 26-ft. raw



Rear view of battery of electric vibrating screens. Between screens may be seen the motors which drive the liquid cyclone separators, below

grinding mill. It is now on the finish side. The essential elements of all four Centriclone installations are identical except that the 7- x 40-ft., three-compartment mill has a 4-in. Wilfley to pick up its discharge instead of a 3-in. The finished slurry from all mills has approximately 36 percent moisture with the mill discharges running at 35 percent. The reason for the one percent dilution has been mentioned previously. From the storage tanks to the kiln, over any extended period of time, the pulp picks up another 1 percent of moisture making it roughly 37 percent. This pick-up in water is due to the same causes previously mentioned. Reducing this water-gain between the ball mill discharge and the kiln is another phase of testing at Victorville.

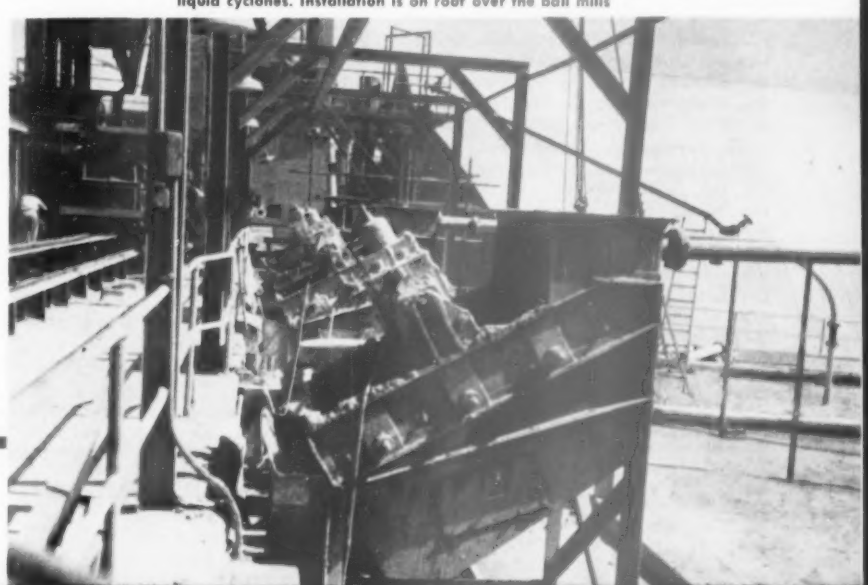
Steps In Changing Over to Centriclones

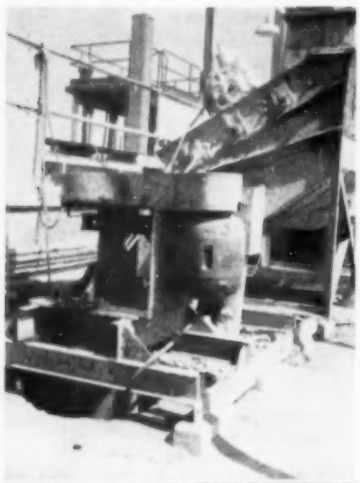
Experimental work on the use of Centriclones started at Victorville in 1951, using a 10-in. Centriclone. This was set up outside along with suitable slurry tanks and related equipment. Next three 10-in. units were installed for mill trials with the intent of using two of the liquid cyclones and the third for a spare. The next step was to buy a 20-in. unit which was installed in July of last year. The results from the experimental work were encouraging enough that all raw mills were equipped with the 20-in. Centriclones and the installations completed during September of 1952.

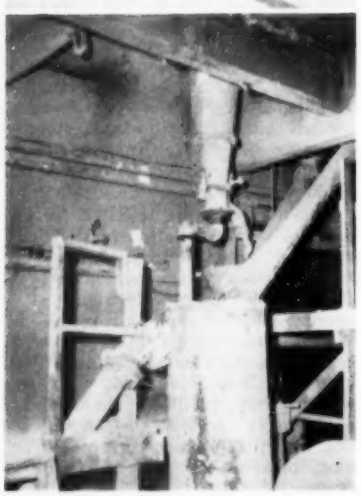
The five grinding mills, in service prior to the installation of the liquid cyclones, were operated in open circuit and the water content of the ball mill discharge was aimed at 36 percent. The amount of throughs for the 200-mesh screen was used as the control factor. This approximated 88.5 percent minus 200 mesh. The four smaller mills produced 75 to 80 bbl. per hour each and the larger, 120 bbl. at this fineness, or an approximate total of 425 bbls. per hour.

The next step was the installation of the Centriclones, after which the 7- x 26-ft. mills averaged 100 bbl. per hour, and the large mill 140 bbl. per hour for a 4½-month average. This permitted taking out one of the 7- x 26-ft. mills as the total output became 440 bbl. per hour which appear-

Front view of electric vibrating screens which take out the plus 16-mesh material ahead of the liquid cyclones. Installation is on roof over the ball mills







Above: Close-up of liquid cyclone 25-hp. motor drive mounted on roof over mills. The cyclone cone extends down through the deck of roof. Below: One of the 20-in. liquid cyclones. The cone extends through the ceiling with the drive section and feed end on the roof. The coarse size is drawn off at a slight angle in the pipe line to overcome any possibility of a line stoppage

ed to be the optimum requirement. However, the fineness was dropped to 84.5 percent minus 200 mesh. There appears to be less over-grinding now as compared to former practice. Tests are being made on the results obtained by the more granular kiln feed.

To summarize the figures given above, the average production per mill for the four mills is now 110 bbl. per hour. An average for the five mills on open-circuit was 85 bbl. per hour, or an increase of 30 percent. Some of this increase in tonnage is due to a drop in the 200-mesh fineness of the grind and the remainder to the Centriclones. Some consideration must be given to the fact that the use of 200-mesh fineness as a control point for open circuit grinding may not be applicable to closed circuit grinding. The Centriclones have acted as a "safety valve" and have kept the oversize particles from contaminating the kiln feed. Operating data shows that there is no increase in plus 50 mesh material. Appended are detailed tabulations showing a typical open-circuit grind and several typical closed-circuit grinds, using the Centriclones, under slightly different conditions.

The estimated circulating load with the Centriclones operating at 900 r.p.m. was in the 30-40 range. When the r.p.m. was increased to 1000, the circulating load climbed to 40-50 percent. With the same screen plate openings, the mill discharge had a moisture content in the 36-37 percent range. The oversize returning to the mills was approximately 32 percent. Details on these and other operating conditions are appended.

Studies are also under way relating to the proper r.p.m. for the Centriclone runner. As low as 820 r.p.m. has been tried. One unit, at the time of inspection, was running at 990 r.p.m. and this seemed to give a better separation. Wear on some parts seems to increase with higher r.p.m. The normal wear of a rubber-covered impeller is about two months. The "follower plate" in the unit has about the same life. A rubber "wear ring insert," or the collar around impeller lasts four to six months. When Pyrocast, an abrasion resisting metal, is used on the impeller and impeller housing they last about six months. The cone sections of the Centriclones that came originally with the units are still in use. Some minor troubles have been experienced with the bearings and these are being corrected. The outlets for the rejects from the cone were re-vamped slightly to reduce chances of line plugs, the outlet was sloped downward at a small angle, and water jets installed. The Centriclones weigh empty about 1500 lb. and require 9 ft. of head room. Surges of pulp to the unit tend to smooth out but are still present. With a surge, more plus material is ejected as finished product.

The management at Victorville indicated satisfaction with the Centriclone installations and the Southwestern Portland Cement Co. expects to install similar units in the Fairborn, Ohio plant.

The Victorville plant of the Southwestern Portland Cement Co. has six kilns. No. 6, the last one to be installed in 1949, is a 10½- x 330-ft. F. L. Smidth with a Fuller inclined-grate clinker cooler. The concrete foundations for this kiln rest on piling. Kiln No. 1 is a 9- x 200-ft. Allis-Chalmers using a Fuller cooler. Kilns No. 2, 3 and 4 are Vulcans, and use rotary coolers. No. 5 is an older German-made kiln modernized with Traylor equipment. Bunker "C" fuel oil is used.

The size of the six kilns are as follows: two 9 x200 ft.; two 9 x 10½ x 200 ft.; one 10 x 13 x 10 x 200 ft.; and one 10½ x 330 ft.

On the finish side there are seven mills. All are Allis-Chalmers except one unit. A new 10½ x 16 ft. Allis-Chalmers finish mill is now installed. It is driven by 1000-hp. motor.

The tabulation on the raw and finish mills is as follows:

Raw and Finish Mill Data

Mill Number			Rated H.P.
Preliminator	9½ x 8	x 10 ft.	450
No. 1 Finish	7	x 22 ft.	300
No. 2 Finish	7	x 22 ft.	400
No. 3 Finish	7	x 26 ft.	500
No. 4 Finish	7	x 26 ft.	500
No. 5 Finish	7	x 40 ft.	750
No. 7 Finish	7	x 26 ft.	500
No. 2 Raw	7	x 26 ft.	300
No. 3 Raw	7	x 26 ft.	500
No. 4 Raw	7	x 26 ft.	500
No. 5 Raw	7	x 40 ft.	900
Finish Dept.	10½	x 16 ft.	1000

Some of the details relating to performance of the grinding system at Victorville follow:

Average Raw Mill New Feed—Composite Samples
December 1952, January 1953
(Black Mountain Quarries)
Screen Analysis

Size	Percent Retained (Cumulative)
¾ in.	4.6
⅜ in.	29.6
4 mesh	57.5
8 mesh	72.3
14 mesh	81.9
30 mesh	87.4
50 mesh	90.0
100 mesh	92.6
200 mesh	94.3

The screen analysis that follows is a typical open-circuit mill discharge slurry with the plus 16 mesh scalped out.

4 x 5 Hum-mer screen scalping plus $\frac{1}{16}$ in. oversize

(This oversize was less than 0.5 percent of feed)

No. 1 through No. 4 mills—7 x 26 ft., No. 5 mill—7 x 40 ft.

Average production open circuit—approx. 85 bbls. per hour—$\frac{3}{16}$ and $\frac{3}{16}$ in. grid openings

Five mills—Aug. Total = 425 bbls./hr.

Average of two samples Sept. 1952; slurry average moisture—36 percent

Average Screen Analysis

Screen Mesh	Percent Retained (Cumulative)
50	0.6
100	2.2
200	8.5
325	10.9

Details of some of the results obtained on closed-circuit grinding are as follows:

Commercial Kiln Feed

Average of five weekly composite samples 12-16-52 to 1-20-53

Closed Circuit with C-20 Centriclones, 4 x 5 ft. Hum-mer Screens

Division and Discharge Openings			3 — 7 x 26 ft. Mills Centriclone	Est. Circulating Load	Hum-mer Screen Open.
Mill No. 2	1½ in.	⅝ in.	900-1000 r.p.m.	40-50 percent	⅛ in.
Mill No. 3	⅝ in.	⅝ in.	900 r.p.m.	30-40 percent	⅛ in.
Mill No. 4	⅝ in.	¼ in.	900 r.p.m.	30-40 percent	⅛ in.
			1 — 7 x 40 ft. Mill		
Mill No. 5	⅝ in.	⅝ in.	¼ in. 900 r.p.m.	30-40 percent	⅛ in.

Average Production
Four Mills Combined

440 bbl. per hour

Finished Slurry Average Moisture
37.3 Percent

Average Screen Analysis
from the Three Mills

Screen Mesh	Percent Retained (Cumulative)
50	0.7
100	6.4
200	15.1
325	25.3

The tabulation that follows shows an average of typical closed-circuit operations, giving a more complete picture of all the products involved. The operating conditions are also included.

Typical Closed Circuit Results
No. 3 Mill 7 x 26 ft.

Closed Circuit with C-20 Centriclone, 4- x 5-ft. Hum-mer Screen

Division Grid Openings, burned out to equivalent of ⅜ in.

Discharge Grid Openings, burned out to equivalent of ¼ in.

Hum-mer Screen Openings ⅛ in.

(About 0.5 percent screen oversize returned to mill)

Centriclone, 900 r.p.m.

Average of Samples 4, 5, 6, 7 and 8 7-24-52 to 7-29-52

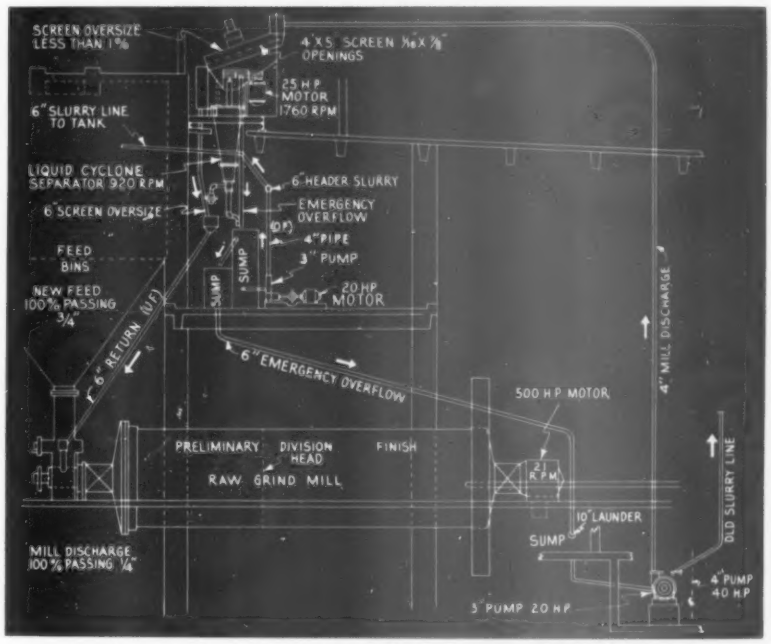
Finished Slurry to Blending Tanks (Classifier Undersize or Overflow)

Approx. 108 bbl. per hour

Average moisture 37.5 percent

Average Screen Analysis

Screen Mesh	Percent Retained
50	0.7
100	3.6
200	11.9
325	18.9



Raw grinding circuit, showing application of liquid cyclone separator

Classifier Oversize or Underflow

Approx. 32 percent circulating load

Average moisture 36.5 percent

Average Screen Analysis

Screen Mesh	Percent Retained
50	5.3
100	11.6
200	21.0
325	27.0

Mill Discharge (Screen and Classifier Feed)

Average moisture 36.9 percent

Average Screen Analysis

Screen Mesh	Percent Retained
50	1.5
100	5.4
200	14.1
325	20.7

The data that follow are from a different mill than the others referred to and this mill has slightly larger grid openings. The r.p.m. of the Centriclone was also higher; i.e., 1000 r.p.m. The discharge openings in the division head were enlarged specifically to get data as to their effect.

Typical Closed-Circuit Results
No. 2 Mill 7 x 26 ft.

Closed-Circuit with C-20 Centriclone, 4 x 5 ft. Hum-mer Screen

Division Grid Openings ½ in.

Discharge Grid Openings ⅜ in.

Hum-mer Screen Openings ⅛ in.

Approx. 0.5 to 1.0 percent screen oversize return to mill

Centriclone 1000 r.p.m.

Finished Slurry to Blending Tanks (Classifier Undersize or Overflow)

Approx. 95-105 bbl. per hour

Moisture 34.7 percent

Screen Analysis

Screen Mesh	Percent Retained
50	2.7
100	10.7
200	19.8

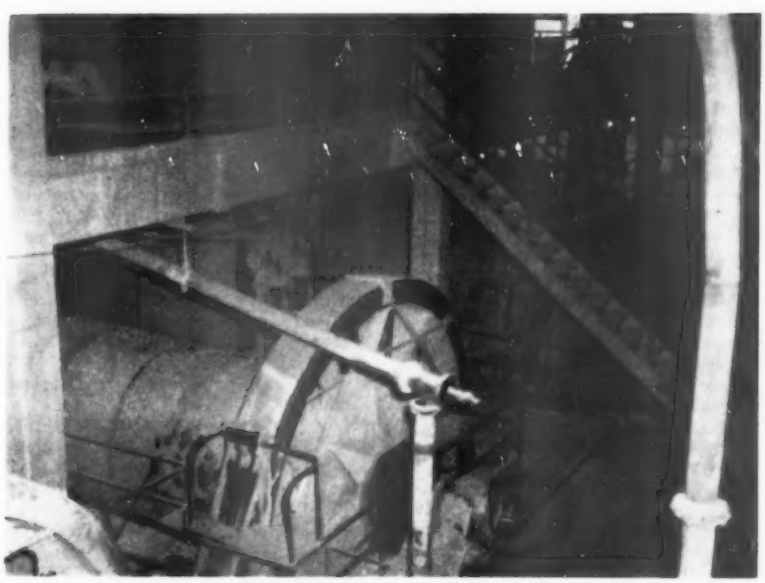
Classifier Oversize

Approx. 50 Percent Circulating Load

Moisture 33.3 percent

Screen Analysis

Screen Mesh	Percent Retained
50	10.7
100	19.6
200	28.0



Raw grinding mill which was changed over to a finish mill as liquid cyclones permitted the production of sufficient raw grind material with one less mill

Mill Discharge (Screen and Classifier Feed)
Moisture 34.4 percent

Screen Analysis

Screen Mesh	Percent Retained
50	61
100	14.2
200	22.7
325	27.9

The production rate diminshed on this run primarily because the feed rate of the mill had to be reduced for fineness control based on 200 mesh. However the moisture has been decreased by approximately 3 percent and good classification still occurred.

The tabulations that follow were obtained from the larger grinding mill and at 900 r.p.m. Centriclone speed.

Typical Closed-Circuit Results

No. 5 Mill 7- x 40-ft. (3 Compartment)

Closed-Circuit with C-20 Centriclone, 4- x 5-ft. Hum-mer Screen
Both Division Grid Openings, burned out to equivalent of ⅜ in.
Discharge Grid Openings, burned out to equivalent of ¼ in.
Hum-mer Screen Openings $\frac{1}{8}$ in.
Less than 0.5 percent screen oversize return to mill.
Centriclone 900 r.p.m.
Special Sample
Finished Slurry to Blending Tanks (Classifier Undersize or Overflow)
Approx. 140-150 bbl. per hour
Moisture 33.5 percent H_2O

Screen Analysis

Screen Mesh	Percent Retained
50	2.0
100	10.8
200	22.3
325	28.0

Classifier Oversize

Approx. 30 Percent Circulating Load
Moisture Approx. 32 percent

Screen Analysis

Screen Mesh	Percent Retained
50	11.9
100	22.8
200	32.7
325	37.9

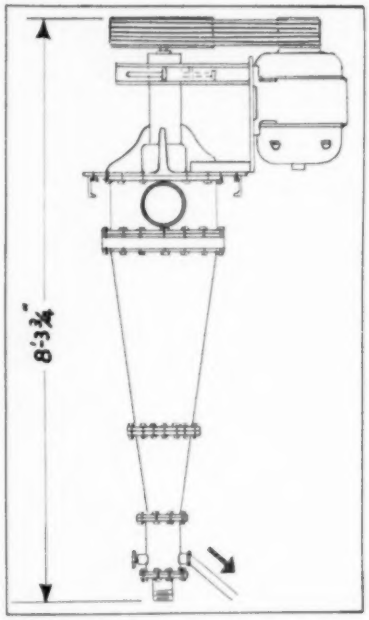
Mill Discharge Screen and Classifier Feed
Moisture Approx. 33 percent

Screen Analysis

Screen Mesh	Percent Retained
50	4.3
100	12.7
200	24.8
325	30.6

Plant Expansion

Plans also have been announced for further expansion of plant facilities at Victorville. They include: the installation of kiln No. 7, a 10½- x 330-ft. Allis-Chalmers; a 6- x 25 ft. Fuller cooler for kiln No. 2; and a 6- x 33-ft. Fuller cooler for kiln No. 7. Completely new crushing facilities will be located at the Black Mountain quarry, approximately 15 miles from the plant. Crushing equipment will consist of one 42-in. Allis-Chalmers gyratory crusher and two Pennsylvania impactors in closed circuit with vibrating screens. Production will be approximately 800 t.p.h., with belt conveyors handling all materials at the crushing plant and delivering the final crushed product to railroad cars.



Details of liquid cyclone separator

Foreign Cement Production

BELGIAN CONGO: A growing cement shortage, due to heavy building and construction activities, has been reported in Belgian Congo. To help ease the shortage, a new cement company, Les Cements Metallurgiques de Jadotville, has been formed to establish a cement plant at Kakontwe.

The Cimiterie d' Albertville, constituted in 1950 and due for completion this year, will have a 36,000-ton annual capacity. The only other Congo cement plant is the Ciments du Congo (CICO) in Leopoldville Province, which has a 100,000-ton annual capacity. Serious consideration has also been given to the construction of new production facilities near Stanleyville and Kivu Province.

DENMARK: Production of portland cement totaled 985,055 metric tons in 1951.

ITALY: Production of cement in 1951 totaled 5,859,038 metric tons, an increase of 11.5 percent over 1950 production and 39 percent higher than the prewar total in 1938. Imports of cement in 1951 totaled 6045 metric tons, compared with 4900 tons in 1950 and 4800 tons in 1938. France and Yugoslavia were the principal sources of the 1951 cement imports. Exports amounted to 222,000 metric tons in 1951. Principal users, in order of importance, were Turkey, San Salvador, Israel and Australia. Domestic consumption of cement increased 45 percent in 1951, over the prewar year of 1938. About 70 percent of the cement is produced by two companies, Italcementi Fabbriche Riunite Cemento, S.p.A. of Bergamo, and Union Cementi Machino & Co., Casale Monferrato.

JAPAN: About 6,548,000 metric tons of hydraulic cement were produced in 1951, of which 834,174 tons were exported. In 1934, the countries buying the largest quantities of cement from Japan were China, Korea, Formosa, Malay Union, Hong Kong, Indonesia and India, whereas in 1951, the largest purchases were made by Singapore, Australia, Pakistan, Hong Kong, Southern Rhodesia, Malay Union and Java, in that order. Kyushu Island contributes a large part of the total Japanese production. The average monthly production of Kyushu's 11 cement plants in 1951 was about 150,000 metric tons, one-quarter of Japan's output. The Korean war has contributed greatly to Japan's increased cement production. The output of 166,102 tons in September, 1951, was more than double the monthly production during the first half of 1950. Expansion facilities in 1952 have increased the monthly output by 50,000 tons.

MALAYA: Malayan Collieries, Ltd., in conjunction with Associated Portland Cement Manufacturing, Ltd., has formed a new company, Malayan Cement, Ltd., which is building a modern cement plant at Rawang State of Selangor, about 18 miles from Kuala Lumpur.

No production of cement was reported in Malaya in 1951, but imports of cement totaled over 310,612 long tons, compared with imports of 270,930 tons in 1950. Announcement has also been made of plans for a cement plant in Singapore.

VENEZUELA: Compania Venezolana de Cemento is expanding its plant at Pertigalete, which is said to be the largest cement plant in Latin America. Production is to be increased from its present monthly output of 25,500 metric tons to 40,000 metric tons. Total cost of the expansion will be approximately $12,000,000 and will include a new kiln, mixer, silos, packing machines, power plant, railway system, and new piers and docks. The company also operates plants at Maracaibo and Barquisimeto.

Venezuelan cement production amounted to 621,491 metric tons in 1951, compared with 501,005 metric tons in 1950. Imports in 1951 amounted to 240,530 metric tons, obtained from Germany, Puerto Rico, the United States, Colombia and Belgium.

These reports were taken from the October, November and December, 1952, issues and the January, 1953, issue of *Mineral Trade Notes*, published by the Bureau of Mines.

What Causes Kiln Rings?

Study of the formation of kiln rings and balls in rotary kilns and effective methods for their removal

By W. G. DAVIS*

REMOVAL OF RINGS and balls which form in rotary kilns is both interesting and intriguing. These galloping rings, as one plant official has called them because they do not form each time in the same place in the kiln, are one of the most expensive items in the entire industry. Kiln down-time costs several hundred dollars per hour.

In general, there are three types of rings: coal rings, which form near the discharge or fire end of the kiln; clinker or fire rings called by some "back rings," which usually form from 20 to 75 ft. from the discharge end; and the so-called "mud" rings, which form much nearer the feed end. The mud rings are not a serious production hazard. The fire rings vary from soft, to others which have mushy exteriors and hard interiors, to extremely hard rings. The balls which form in some kilns are likewise of different degrees of hardness.

In our company's current study of ring and ball formations, I have talked with members of the Research and Development division of the Portland Cement Association and hundreds of operating and plant executives of cement, lime, and refractory plants.

As a result, I have learned of 22 basic reasons why rings form. There are no doubt many more. As any combination of two or more of these may result in rings, it can be readily reckoned that there are more than 484 causes. Is it any wonder that it is almost impossible to prevent them at times? The 22 basic reasons are as follows;

What Can Make Rings and Balls in Rotary Kilns

1. Changing conditions of fuel, including irregular firing
2. Changing conditions of combustion or draft
3. Variations in load materials in regard to volume (raw-feet delivery)
4. Variations in load materials in regard to analysis
5. Intermittent service—lack of steady runs
6. Too much heat—may cause fusing scale
7. Too little heat—may cause stickiness
8. The human element—not watching kiln and instruments
9. Wrong type of lining in wrong spots
10. Wear of kiln lining
11. Spalling or slogging away of kiln lining
12. Type of fuel—grade (cost)
13. Distance of flame
14. Spotty glazing or coating on lining
15. Wrong type of bonding material
16. Bringing kiln up to operating temperature too fast—Newly-laid linings and old linings which have stood idle long enough to absorb considerable moisture from the atmosphere
17. Variations in rotation speed of kilns
18. Variations in size of materials (in some plants fines cause more rings)
19. Variations in material composition
20. Inadequate coal grinding to suitable fineness
21. Flame nozzle or end partially burned away
22. Wrong length to diameter ratios of kiln

It is recognized that no two runs, whether in the same kiln or not, are under exactly identical operating conditions. There is much that occurs in a kiln that can and does have a very definite effect on refractory life. Many refractory materials used in rotary kilns must withstand exceedingly high temperatures without fusing with the raw materials being calcined.

One plant which had no rings for nearly three years recently has had a series of them. Another plant which has three kilns has had rings rarely in one kiln, occasionally in another, and often in their third kiln, although all kilns are the same size, are fed from a common source, and use the same fuel. Some days rings have been removed from all three kilns, on other days in two kilns, while on still other days none have formed. To prevent these formations, four different grades of coal have been tried with apparently no outstanding results. Another plant has changed to oil with no marked results. This has been most embarrassing to the plant engineers.

In 1951, one plant estimated that it had lost over $625,000 worth of production as a result of rings, while another plant figured its loss as $126,000. By studying one plant's 1951 records, it was found that it had shot rings in at least one of its kilns 335 days during that year. Many other cases could be cited, but I believe these will give you an idea of the seriousness of ring troubles.

Why can't they be prevented? Seriously, I must say, I do not know. If some of the best and most outstanding brains in this country do not know, far be it from me to offer a solution.

Methods of Removing Rings

It has been ascertained that there are 13 methods currently being used to remove or reduce rings. There may be many more, but the 13 are:

1. Shifting the burner closer to the ring
2. Re-aiming the flame-burner positioning
3. Shooting with compressed air
4. Stopping the kiln at intervals, cooling and shrinking the ring until it breaks or until particles wedge between the lining and the ring, and therefore pry it off.
5. Using carbon dioxide bombs inserted through the kiln shell
6. Scraping or boring with long and heavy water-cooled boring bars
7. Using steam or water lances and jets
8. Melting down with increased fuel and temperature
9. Employing strong reducing or oxidizing conditions for short alternate periods
10. Manually punching out the rings with bars when their position is close enough; that is, using poke and boring bars
11. Cooling off the kiln entirely so that the cooled ring can be removed or reduced manually with air drills or hammers
12. Changing the kiln draft drastically for short periods
13. Shooting with industrial guns and shells

Kiln manufacturers, and the many plants contacted in Remington Arms Co.'s current study seem to agree that shooting by the use of industrial guns is most efficient and the best method. Shooting of the rings and balls means no extended kiln down-time. All that is necessary is to hook up the industrial gun, turn off the flame, stop the kiln rotation, shoot off or reduce the ring, and then start up again. There is little loss of heat, no loss of clinker, and only a small production or direct labor loss.

(Continued on page 94)

*Special Representative, Remington Arms Co., Inc. From an address before the factory operators' meeting of The Refractories Institute

Five Plants In A 30-Mile Radius

Looking from Ray No. 2 plant across conveyor suspension bridge to cars dumping material from deposit into bins from which it is moved by reclaiming conveyor to long conveyor crossing river

OPERATING FIVE PLANTS within a radius of 30 miles of each other, Thorstenberg and Tamborello, with offices in Houston, is one of the largest producers of sand and gravel in Texas. Two of the plants are at La Grange and Fayetteville, and three in the Columbus-Eagle Lake area. Practically all shipments from all the plants are by rail. The plants are all on the flanks of the Colorado river, a north-south running stream, some 72 miles west of Houston. Three other large producers have several plants in the same general district so the Colorado river area is an important producing sou ce that is streaming 2000 to 3000 p.h. of sand and gravel into the metropolitan sections. Gravel beds are relatively thin and stripping depths are high.

Depletion Problem

Any area that produces sand and gravel at this rate has its depletion problems and the Colorado river area in Texas can be cited as a classic example of that trend. Depletion is not entirely dependent on the size of a gravel deposit. Whether or not a given deposit can yield a profit is more important as a depletion factor than the size of the deposit, for obviously what good is a sand and gravel deposit containing billions of tons of material if it is out in the middle of the desert and cannot be operated profitably. It is possibly true that in the Colorado river area of Texas there is a large acreage of land under which there are relatively thin beds of sand and gravel. Some of these plots are in rough terrain and therefore do not lend themselves to economic exploitation. Other plots are too small in area to be worth working. Still other plots are far distant from large plants already established so that to reach them new and costly transportation techniques are required. One company has had to install a relatively high cost aerial tramway. A second is installing some eleven miles of standard gauge railroad to reach a new deposit. Thorstenberg and Tamborello at the main producing plant, Jay Ray No. 2, had to install a costly bridge structure to carry a long belt conveyor. Obviously, with pit operations of magnitude on one side of a river, and plant operations on the other—and these are miles apart—duplication of supervisory staff, and extra handling of raw material all add up to more costly operations. Should these cost factors ever reach the red side of the ledger, the operation can be depleted.

Jay Ray No. 2 plant. Small bin at the right, center, serves the two primary crushers. Two parallel conveyor belts return throughs from crushers to the main plant belt

Left: Steel tower on west bank of river for the suspension bridge carrying belt conveyor at Jay Ray No. 2 plant. Center: Feeding sand-loam to surge pile belt to provide additional fines. Right: Showing cable suspension and tower of bridge carrying conveyor belt to main plant

Thorstenberg and Tamborello, Houston, Texas operates five plants within a radius of 30 miles as insurance against deposit depletion. Three are permanent plants and two are portable

By WALTER B. LENHART

The Jay Ray plants, No. 1 and No. 2, are both located about 8 miles south of Columbus, Texas. No. 1, a portable-type plant, is quite close to Jay Ray No. 2. Jay Ray No. 1 is all on the east bank of the Colorado river. Jay Ray No. 2 is the largest plant of all of Thorstenberg and Tamborello's operations, and is a permanent installation capable of turning out 400 to 500 t.p.h. of washed sand and gravel. It was designed by R. L. McMillian, general superintendent.

Gravel and sand for the plant is excavated in an area about 2 miles west of the plant. An 8-cu. yd. dragline loads to standard gauge gondolas, and in trains of five cars the material is hauled to a long steel track hopper serving a belt conveyor system that delivers to a surge pile on the east bank of the river and adjacent to the plant. The practice is to strip at night and load gravel in the daytime. Strippings run from 14 to 16 ft. in depth to get 24 to 26 ft. of gravel. All gravel is excavated from under water, and a novel feature here is that 2 to 3 ft. of stripping is also done under water. Skill of the operator and the "feel" is the main guiding factor when stripping under water. Spoils are cast back into the worked out sections of the pit. The absence of gravel in these spoils can testify to the basic soundness of the practice. The gravel is relatively small in size with small fractions in the 4 to 5-in. size. It is a hard, tough, abrasive, dark colored (brownish) material, free from any contaminants. Some clay is present but not a troublesome factor. The sand is clean and sharp but deficient in the finer sizes so the practice is to haul in by trucks some fine sandy loam. This is fed to the main belt crossing the bridge in a small steady stream, and in the plant a liquid cyclone recovers enough of the fines to bring the current production up to specifications.

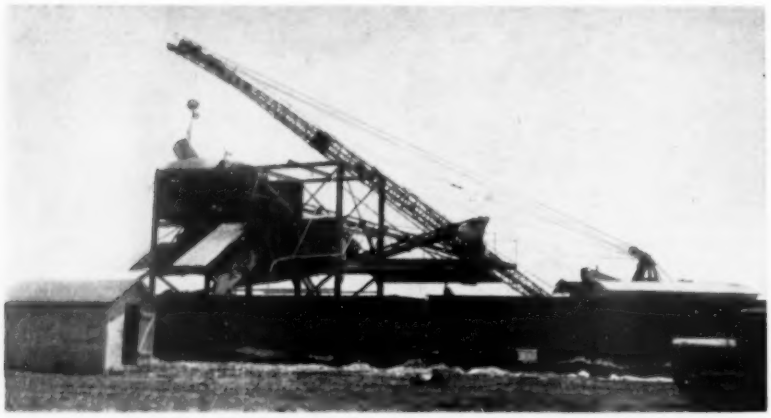
The area being excavated is relatively flat with water tables at the 13- to 14-ft. horizons. Casting the strippings back into worked out parts of the pit means that the dragline must have a long enough boom to dig and cast the spoils far enough back so they will not sluff back over the gravel bed. As the Bucyrus-Erie dragline used here has a 175-ft. aluminum alloy boom, roughly 20 ft. of freeboard is left between the toe of the spoils pile and the gravel bed. The dragline was formerly a Class 230 steam unit that was purchased from a Louisiana operation. General Superintendent R. L. McMillian rebuilt the unit from stem-to-stern changing it to a diesel, and streamlining its entire structure. Its main source of power is a 12-cyclinder, No. 567 General Motors 600-hp. diesel that has been slowed down to 530 r.p.m. The hoist and dragline drums are operated directly off the engine with silent chain drives. For the swing assembly, a 100-kw., d-c. generator is driven through "V" belts from the main engine, and this generator powers a 75-hp. d-c. swing motor. The dragline is mounted on four dollies, each dolly with four flanged car wheels and suitable railroad trackage is provided in short sections. As the older steam machine had a power take-off, the dragline was self-propelled but this proved to be a troublesome system so that portion was dispensed with entirely. The dragline is now moved by swinging the boom 180-deg. (plus or minus) and the 8-cu. yd. Hendrick bucket digs into the top soil serving as a "dead-man" for moving the unit.

General practice is to cut a swath 3000 to 4000 ft. long and 140 to 160 ft. wide, and keep the industrial track parallel to the digging. The dragline loads to open-top, bottom-dump gondolas that have been reinforced with heavy steel cables to prevent bulging. The cars hold 40 cu. yd. and are pulled to the unloading hopper by 35-ton Plymouth locomotives. Two trains, of five cars each, shuttle back and forth on time schedules so that one train is loading while the other is enroute and unloading. Pit operations, on a 10-hr. shift basis, produce 500 t.p.h. The rail haul is about 1½ miles.

Conveyor Suspension Bridge

Near the west bank of the river is a track hopper of steel and concrete construction long enough for 2½ cars. Under the tracks are 11 steel hoppers, each with quadrant-type gates that feed to a horizontal 36-in. reclaiming belt conveyor, 90 ft. centers. This belt in turn feeds a long 30-in. belt

A 35-ton locomotive pulling train of cars which unload to steel hoppers that serve belt system to processing plant at Jay Ray No. 2



Jay Ray No. 1 plant. Dragline dumping to bin feeding portable plant

conveyor that carries the material across the river via the suspension bridge. Near the feed end of this belt conveyor, a short cross belt, serving a truck hopper, delivers continuously to the main belt conveyor the sand-loam material, source of the added minus 100-mesh sand required. The "bridge" belt was delivered to the plant in one piece 1800 ft. long and was vulcanized at the job. This, and other important belts in the assembly, were supplied by the Boston Woven Hose Co. The "bridge" belt is one of the longest single pieces of belting to be installed in the Coastal Area. The belt has been in service about 2½-years and is in good condition.

R. L. McMillian, general superintendent, to the left, and Roland Woehst, superintendent of Jay Ray No. 2 plant (west side)

Of particular interest is the suspension bridge which supports the belt conveyor on 880-ft. centers. It was designed by Mathews and Keenan of San Antonio. This engineering firm has specialized in designing suspension bridges for pipe lines. The bridge at Jay Ray No. 2 has a clear span of 640 ft. The two main suspension cables are 2⅛-in. dia. galvanized wire with the wind sway cables 1½-in. dia. bright. The ⅜-in. vertical cables are on 10-ft. centers.

Supporting towers rest on piers having 90 cu. yd. of concrete and 12 steel pilings. The steel towers rise 80 ft. above the concrete piers which are 26 ft. wide. Wind arms, also of heavy structural steel, are 120-ft. wide. The concrete "dead-men," for the wind and main cables, each comprise 240 cu. yd. of concrete with 20 steel 42-lb. piling driven to a maximum depth of 64 ft. The steel towers are pivot-hinged on their foundations and the structural steel frame carrying the idlers is also pivoted to allow for movement due to load stresses, wind, or expansion and contraction. The conveyor belt is left loaded at all times on the bridge, and there is a difference of 3 ft. in the sag of the belt between loaded and unloaded periods. Stearns idlers are used throughout. The American Steel & Wire Co. supplied the galvanized wire and the Consolidated Steel Co. fabricated the towers at their Orange, Texas plant. Some other steel sections of the bridge were supplied by the Peden Iron & Steel Co., Houston. The bridge was erected under contract by the Pittsburgh Des Moines Steel Co.

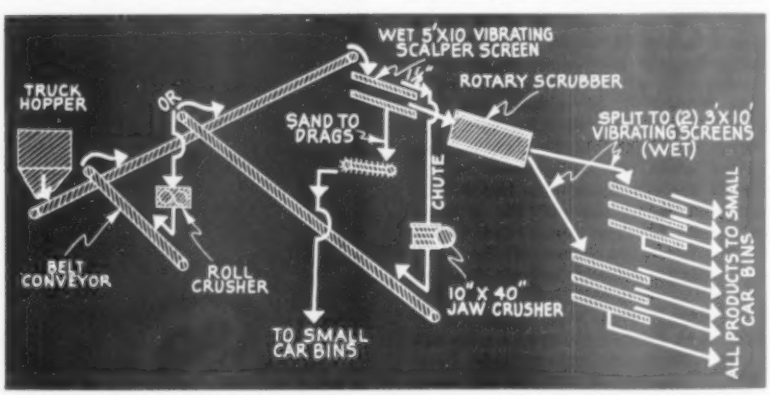
One minor problem related to the location of the main and wind cables at the west end; they had to be placed near a section of the train unloading hopper. The carrying line had to be high enough to clear the trains and the wind cables likewise had to clear the tracks. This problem was solved by letting the wind cables pass through the hopper assembly. The north wind cables pass through the railroad fill via a steel pipe. The south wind cables pass through one of the 11 steel hoppers with an adequate sized opening.

The long belt conveyor unloads to an inclined stacker belt serving the surge pile ahead of the plant. This is a 36-in. belt, and is 120 ft. long. It is a radial stacker with the high end riding on a 60-ft. long arc. This permits building up a large pile, yet the radius of the arc is not a detriment to the straight-in-line reclaiming tunnel under it. There are 12 quadrant-type gates under the surge pile. The radial stacker operates via push-button controls. Belt No. 1 from the surge pile to the plant is 30-in. wide and about 300 ft. centers.

Crushing, Washing and Screening

The washing and screening plant features the use of a Cedarapids double jaw crusher and a 3-ft., Symons cone crusher that receive a split feed from a small surge bin that follows the scalping operation. These two crushers are essentially primary units. A second 3-ft. Symons cone crusher was recently added. The throughs from the first cone crusher are moved by belt conveyor back to No. 1 belt between the surge pile and the plant. Throughs from the double jaw are carried on a separate belt to the new cone crusher without intermediate screening. Another inclined belt carries the throughs to the main belt from surge pile No. 1. The set-up, shown in the illustration, is such that any crusher can be cut out without radically disturbing the flow of crushed gravel.

In the plant are two Simplicity triple-deck screens, operating wet; a 5- x 14-ft. and a 5- x 12-ft. unit. The larger Simplicity serves as a scalper with the plus carried on a short stub



Flowsheet of La Grange plant, showing layout of crushing, scrubbing and screening operations

conveyor to a steel bin serving the two primary crushers. Prior to the installation of the cone crusher, oversize was chuted direct to the double jaw crusher.

The plant uses very small storage bins ahead of the cars so all material is essentially loaded as produced. There are three parallel lines of track under the plant so that materials can be loaded as made. Two car pullers are used.

Sand Recovery

Sand from the screens flows to a rectangular steel box. Originally there were two boxes. One was 10- x 17-ft. in area and the other 8- x 15-ft. Both were 8-ft. deep. A partition separated the two boxes. The partition has been removed so the box is essentially one settling unit with the flow going into the end of the larger section. In that section, which is cone-shaped, are four adjustable outlet gates for the settled sand. In the smaller box is one adjustable gate followed by three fixed ¾-in. circular openings, and the pulp from all openings converges and falls to a set of twin 30-in. Eagle sand screws that are mounted below the recovery box.

Sand from the pit contains only 1 to 3 percent of minus 100 mesh material and requirements are in the 5 percent range so the sandy loam, previously mentioned is added ahead of the surge pile to make up the deficiency. In the plant, a liquid cyclone has been added to recover the fines as needed.

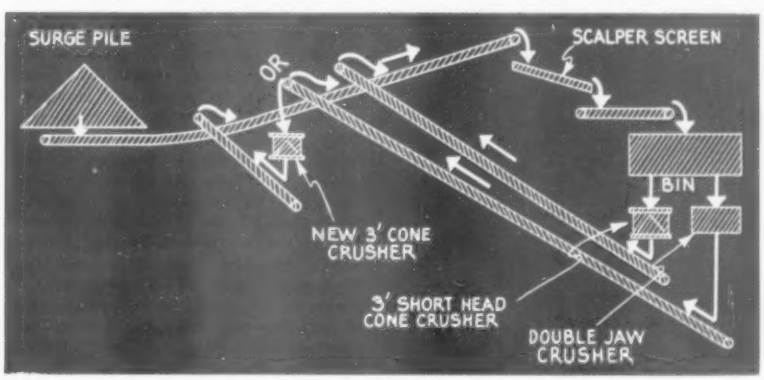
The twin Eagle screws have a flared overflow to which has been added a triangular-shaped end box so as to give more settling area. This triangular area is the width of the flared tank and about 4-ft. long on its other leg. Any sand that settles in this section is picked up by a 3-in. centrifugal pump and the pulp delivered to an 18-in. (dia.) Whirlcone*, or liquid cyclone, which is mounted above the Eagle sand screws at a point near their sand discharge end. The liquid cyclone recovers additional minus 100 mesh sand which is mixed in the sand screws with current production.

Essentially the Whirlcone is a small cyclone collector similiar to a dust collector. Pulp is pumped into the liquid cyclone under pressures in the 15 to 35 p.s.i. range. The intense centrifugal action within the units causes the heavier (or larger) particles to work to the perimeter of the cone, thence work downward and discharge through the bottom of the cone. The largest units made are roughly 25 in. in dia. Larger cones than 25-in. dia. do not function properly. At Jay Ray No. 2, the 18-in. cone has a molasses valve at the outlet for control purposes. The 3-in. pump handles only a fraction of the total overflow pulp from the Eagle sand screws, and the excess flows to a launder towards the waste area. In this waste launder has been imposed a small settling box so that heavier material in the pulp collects in it, and is picked up by a centrifugal pump and sent to a distant waste pond. The excess flows by gravity to the waste area.

*Whirlcone is made by Cottrell Engineering Co., of Los Angeles, Calif., and by the Georgia Iron Works for the eastern markets.

"Walking" dragline which strips material for Jay Ray No. 1 plant at night and loads gravel during the day shift

La Grange plant which produces washed sand and gravel



Flowsheet of crushing operations at Jay Ray No. 2 plant

Portable Plants

Two of the plants, Jay Ray No. 1 and Ramsey, are of the portable type, and are so similar that the description will be mostly confined to the Jay Ray No. 1 operation. The Jay Ray No. 1 plant is adjacent to the Jay Ray No. 2. Ramsey is about 3 miles to the east.

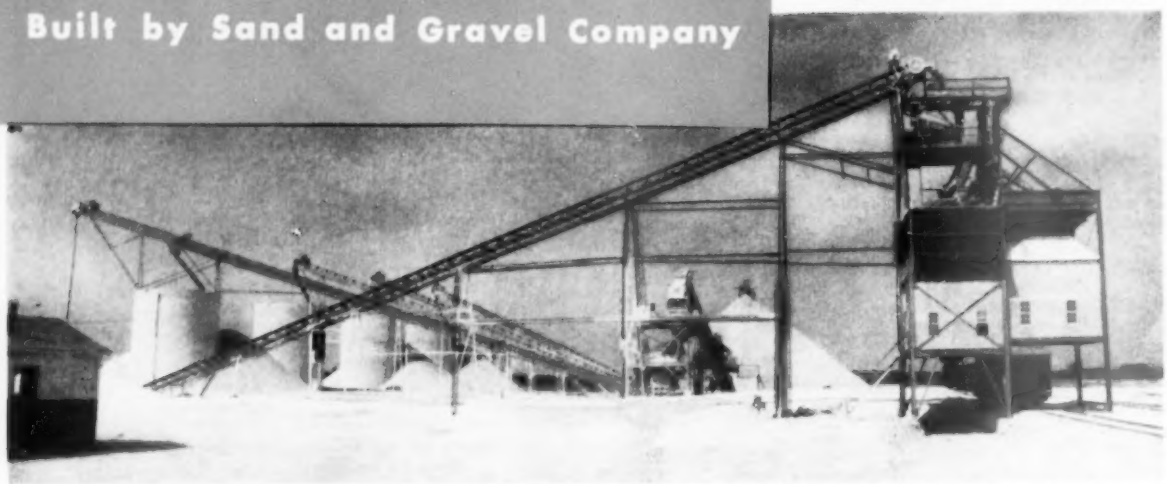
Jay Ray No. 1 strips 7 to 14 ft. of overburden to get 7 to 15 ft. of gravel. It moves about 20 ft. per day. It is electrically-powered, and several thousand feet of heavy duty cable are kept on a reel to provide for this movement. At Ramsey 10 ft. of overburden is moved to get roughly 18 ft. of gravel. Both plants are on the Southern Pacific railroad, but the company owns several miles of track-

(Continued on page 98)

CRUSHED STONE PLANT

Built by Sand and Gravel Company

By WALTER B. LENHART



Overall view of plant showing concrete silos with reclaiming tunnel conveyor below, to the left, surge pile in center background, and car and truck-loading section, to the right

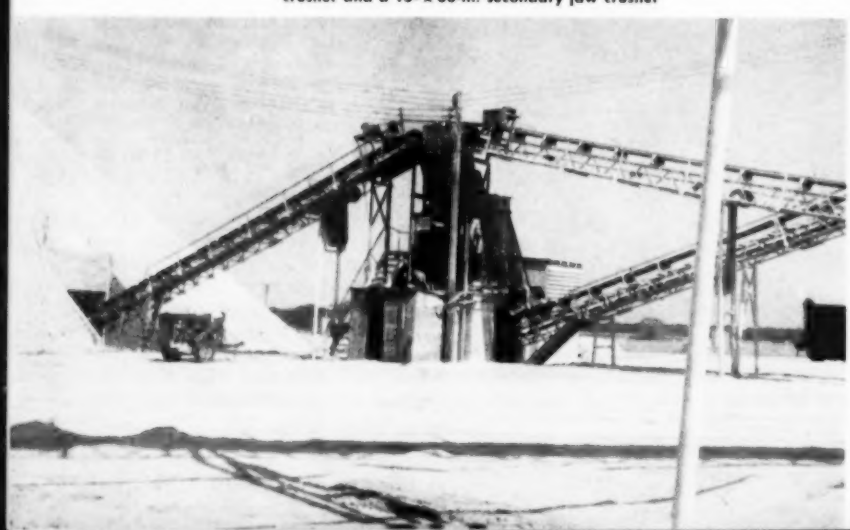
Ft. Worth Sand & Gravel Co., constructs crushed stone plant near Bridgeport, Texas to obtain new source of aggregate. Plant incorporates sand and gravel practices. Four concrete silos with intervening ground storage over reclaiming tunnel

ONE OF THE IMPORTANT REASONS for the Ft. Worth Sand & Gravel Co.'s venture into the crushed stone field with a new and modern plant at Bridgeport, Texas is the ever-present specter of depletion hanging over many of the rock products industries, particularly in the Gulf Coast states. Bridgeport is about 48 miles north of Ft. Worth.

Early this year the Ft. Worth Sand and Gravel Co., Inc. was sold to Texas Industries, Inc., Dallas, Texas. T. E. Poppelwell, president of Ft. Worth Sand and Gravel Co., is a past president of the National Sand & Gravel Association and active in the affairs of that group as well as the National Ready Mixed Concrete Association. Mr. Poppelwell will continue to serve as president for at least a year.

Texas Industries, Inc., is a rapidly growing organization with headquarters in Dallas, Texas. This company is probably the largest producer of expanded shale and clay lightweight aggregates in the world with plants strategically located in Texas and Louisiana. A new and modern lightweight aggregate plant is scheduled to go into production late this Fall at Oklahoma City, Okla. Texas Industries, Inc. also is well known throughout the Southwest as the parent company of the Texcrete Companies, producers of concrete masonry units and concrete pipe. At this writing Texas Industries, Inc. has 28 producing plants in the states named. The acquisition of the Ft. Worth Sand & Gravel Co. is the first venture into the hard aggregate production field. Ralph Rogers is president of Texas Industries, Inc., and Cedric Willson is chief engineer. Mr. Willson is well known in the portland cement industry, having formerly been with the Trinity Portland Cement Co.

Final crushing unit is a 5½-ft. cone. The other two crushers are a primary 42- x 30-in. jaw crusher and a 15- x 36-in. secondary jaw crusher



Quarry Operation

The rock being processed at Bridgeport is a high calcium limestone, suitable for chemical and flux stone as well as for construction aggregate uses, and it meets all specifications in the state. The quarry is in an old producing area with another company operating a crushed stone plant a few miles north of the new operation, and a second company a few miles to the south. The quarry of the Ft. Worth Sand & Gravel Co., Inc., was used at one time by a portable plant as a source of rock.

The quarry is located on the west flank of a small ravine with some overburden that is largely removed with tractor and dozer. Preliminary operations have been devoted to straightening out the general face contours so that eventually bench shooting can be practiced. However, up to early summer all rock produced was from relatively shallow holes drilled by a Denver-Gardner wagon drill supplemented by jackhammers. In the quarry a Northwest 80-D shovel loads 17-ton Easton side-dump trailers powered by 130-hp. White tractors. There are three tractor-trailer units. The round trip is made in 12 min., using one gallon of gasoline per trip. Air for the one Gardner-Denver wagon drill and the three jackhammer drills is obtained

from a 600 c.f.m. rubber-tired, Gardner-Denver air compressor. An HD-7 Caterpillar and dozer rounds out the quarry equipment.

Crushing Plant

Beds of high calcium limestone lie almost in a horizontal plane with the flat bedding zones having some easily friable material in them. These inclusions were first removed in a dry screening operation that followed immediately after the primary and secondary crushing operation, but ahead of the surge pile serving the final screening and reduction plant. This was accomplished by screening out all the minus ½-in. material and trucking it to waste. However, during May of this year (1953) this section of the plant was re-vamped and a 7 x 14-ft. Allis-Chalmers blade mill installed so that all materials going to the surge pile are given a preliminary scrubbing. Water for the scrubber is secured from a small artificial lake created by a small dam thrown across a close-by ravine.

The plant can be divided up into two sections; the section ahead of the surge pile, and that following it. In the first section, a 42- x 30-in. Pioneer jaw crusher is fed from the truck hopper by an apron feeder. The throughs are sent by belt conveyor to a 5- x 14-ft. Robins double-deck scalper screen, operated dry, with the oversize chuted to a 15- x 36-in. Pioneer jaw crusher that serves as a secondary crusher. From the screen, a plus 5-in. material goes to the secondary jaw crusher. The secondary Pioneer discharges to a return belt conveyor serving the No. 1 belt. The minus 5-in. stone formerly went to the second screen where the minus ½-in. was discharged.

Recently opened quarry having beds of high calcium limestone lying in a horizontal plane. Shovel is loading 17-ton hauling unit

Now, however, this stone all goes to the Allis-Chalmers blade mill after which it is screened on a 5- x 14-ft. Robins double-deck screen, operated wet, and the plus ½-in. fraction (minus 5 in. plus ½-in.) goes to the surge pile. The minus ½-in. fraction is sent to a 36-in. Eagle washer and the minus ½-in. material recovered here is kept separate from other production. The overflow from the Eagle washers goes to the waste pond. This change in the processing has resulted in a high recovery of acceptable aggregate which was formerly wasted, and has materially aided in reducing the dust problem.

Conveyor System

Material from the surge pile is reclaimed by two Jeffrey electric vibrating feeders and the material moves by conveyor belt to a 5½-ft. Symons cone crusher. The mantel and cone of the gyratory was equipped originally with manganese step liners but in operation they tended to retard production so the corners of the steps were ground off.

Throughs from the cone are belted to one of two 6- x 14-ft. Robins Gyrex, triple-deck vibrating screens operated dry, and the plus fraction from the first screen is conveyed back to the Symons unit.

Four inclined conveyor galleries finger out from the screening tower to deliver the material either to one of four concrete silos or to ground storage piles at the ends and be-

Left: Final screening tower which has two 6- x 14-ft., triple-deck vibrating screens. Conveyors in the foreground carry material to storage silos. Right: Loading out facilities; railroad cars are loaded on the far side and trucks are loaded below the bins

Quarry haulage unit dumping to primary crusher, to the left, with scalping and secondary crushing units, to the right

All material in surge pile is minus 5-in. material for processing in the primary crusher

Close-up of quarry haulage unit dumping its load to primary crusher

tween the silos. One of these galleries carries two parallel conveyor belts for the smaller size of crushed limestone. The four silos are arranged in a single row and each has a capacity of 700 tons. The flow chart gives the screen sizes at the time of inspection. The system of using silos and/or ground storage permits a larger number of screen sizes to be stocked as the marketing requirements in the area are quite diversified.

Reclaiming Tunnel

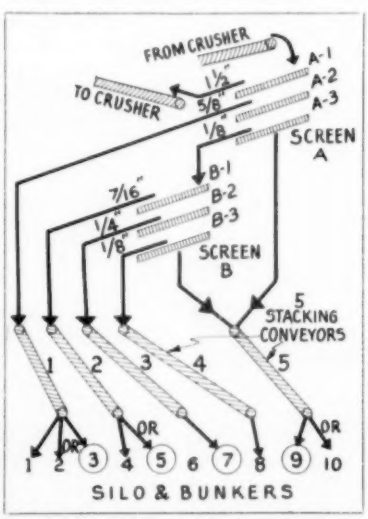
Under the storage area is a concrete reclaiming tunnel with a total of 16 quadrant-type reclaiming gates. There are two gates per silo except for the silo holding the fines. All coarser material can be given a final screening by a third 5- x 14-ft. Robins screen that is mounted over the loading facilities. There are four Blaw-Knox

Car switching unit has pneumatic-tire wheels for operation on the ground

bins for truck-loading and one for car-loading. The plant is adjacent to the tracks of the Rock Island railroad. The plant has a capacity of 200-t.p.h. ahead of the surge pile and 165-t.p.h. of finished material.

Preliminary plant designs were prepared by E. Leo Heidenreich, Jr., in cooperation with E. V. Scott, general manager of the crushed stone operation. The plant is a neat and well laid out assembly of units built of steel and concrete throughout. It was constructed by the Wilder Construction Co. of Ft. Worth with Ray Thomas, general plant superintendent for the Ft. Worth Sand & Gravel Co., Inc., handling some phases of the construction.

Car switching is done with a 6000-lb. capacity Trackamobile. This is a rubber-tired unit that can be used



Flowsheet shows wide variety of sizes

for miscellaneous purposes about the yard, and can be moved from track to track, or to obtain empties, or pull out loads. Once the unit is on the rails the rubber-tired wheels fold out of the way. It is a relatively light unit, but in operation it hooks onto the freight car in such a manner that some of the weight of the car to be moved is carried by the Trackamobile, thereby giving it the needed traction. The unit is made by the Whiting Corp., Harvey, Ill. It will handle two loaded cars at Bridgeport with ease, or five empties.

Peter Van Meter is plant superintendent.

A.S.T.M. Committee C-7 on Lime

THE DESIRE WAS EXPRESSED at a meeting of Committee C-7 on Lime, held on March 6 in Detroit, Mich., as part of the A.S.T.M. Committee Week, that closer coördination was felt desirable between Committee C-7 and Committee C-12 on Masonry Mortar in approving the new Tentative Specifications for Mortar for Unit Masonry (C 270 T) in respect to the reference and classification of lime mortars. A joint meeting of the Structural Lime subcommittee and the Mortar Specifications subcommittee of Committee C-12 is being planned during the 1953 annual meeting in Atlantic City to discuss this matter.

A new proposed method for determining the settling rate of lime was accepted for committee letter ballot. Six laboratories will participate in a round-robin testing program to evaluate the different methods for available CaO. Another series of round-robin tests, with eight laboratories participating, will compare two autoclave methods, one using a gypsum admixture and the other a portland cement admixture.

A new subcommittee was authorized to prepare specifications on lime for soil stabilization. Nathan C. Rockwood, ROCK PRODUCTS, was designated as chairman.

Committee C-7 will hold its next meeting during the 1953 annual meeting of the society in Atlantic City. The officers of Committee C-7 are: Chairman: J. A. Murray, Massachusetts Institute of Technology, Cambridge, Mass.; secretary: Robert S. Boynton, National Lime Association, Washington, D.C.

Leases Quartz Property

OROFINO LIME PRODUCTS, INC., Orofino, Idaho, which has been inactive for the past four years, is expected to be in operation again in the near future with the leasing of a 240-acre quartz deposit from the Idaho State Land Board.

RESEARCH POINTED TO NEW MARKETS

Annual convention of National Lime Association discusses road stabilization, neutralization of industrial wastes, mortars, safety, and fundamental research at M.I.T.

THE FIFTY-FIRST ANNUAL CONVENTION of the National Lime Association, held June 8-10 at The Homestead, Hot Springs, Va., had a well-rounded program. Besides the transaction of business matters and the election of officers and directors, the subjects of safety, labor relations, research in all its aspects, and new markets were thoroughly covered.

There were three morning sessions and the afternoons were left open for individual discussion, golf or other recreation according to custom. Special entertainment included the annual reception and banquet, and bingo party. Retiring president and chairman of the board of directors Wallace E. Wing, presided for the opening session; David K. Shroyer, H. E. Millard Lime and Stone Co., Annville, Penn., was chairman for the second session; and K. L. Hammond, Keystone Lime Works, Inc., Keystone, Ala., presided for the concluding session.

Officers

Amos B. Miner, National Gypsum Co., Buffalo, N.Y., was elected president and chairman of the board of directors of N.L.A. for 1953-1954, to succeed Wallace E. Wing, Marblehead Lime Co., Chicago, Ill., who had served in that capacity for four years. Paul Sunderland, Ash Grove Lime and Portland Cement Co., Kansas City, Mo., was re-elected treasurer. General manager Robert S. Boynton and secretary Gladys L. McBee were also re-elected.

The executive committee comprises Reed C. Bye, Warner Co., Philadelphia, Penn.; Bolton L. Corson, G. & W. H. Corson, Inc., Plymouth Meeting, Penn.; Ralph L. Dickey, The Kelley Island Lime and Transport Co., Cleveland, Ohio; C. C. Loomis, New England Lime Co., Adams, Mass.; K. L. Hammond, Keystone Lime Works, Inc., Keystone, Ala.; Wallace E. Wing, Marblehead Lime Co., Chicago, Ill.; and Michael Brisch, Rockwell Lime Co., Manitowoc, Wis.

Directors

Elected to the board of directors were the following:

Region 1—C. C. Loomis.

Region 2—Bolton L. Corson, J. P. Feiser, Le Gore Lime Co., Le Gore, Md., and E. D. Williams, H. E. Millard Lime and Stone Co., Annville, Penn.

Region 3—Reed C. Bye, Warner Co., Philadelphia, Penn., and F. J. Collins, The Kelley Island Lime and Transport Co., Cleveland, Ohio.

Region 4—Amos B. Miner.

Region 5A—Fred Witmer, The Ohio Hydrate and Supply Co., Woodville, Ohio.

Region 5B—Charles Rarey, Marble Cliff Quarries Co., Columbus, Ohio.

Standing, left to right: Mrs. Amos B. Miner, Mrs. John V. Andrews, H. D. Brigstocke, Mrs. John S. Schirm, John S. Schirm, Mrs. Paul Sunderland, Kennedy Ellsworth, Mrs. K. L. Hammond, W. V. Hammond, Mrs. Ralph L. Dickey, Mrs. Robert S. Boynton, Mrs. W. V. Hammond and Ralph L. Dickey. Kneeling are Mrs. H. D. Brigstocke and Philip L. Corson

Region 6—Stephenson Smith, Limestone Products Co., Menominee, Mich.

Region 7—Robert F. Mathews, Mississippi Lime Co., Alton, Ill., E. H. Siebrasse, Menke Stone and Lime Co., Quincy, Ill., and Wallace E. Wing.

Region 8—V. F. Nast, Sr., The Western Lime and Cement Co., Milwaukee, Wis.

Region 9—Paul LaLiberte, Cutler-Magner Co., Duluth, Minn.

Regions 10 and 11—M. A. Rikard, Southern Cement Co., Birmingham, Ala., and George L. Scott, Jr., Alabaster Lime Co., Alabaster, Ala.

Region 12—Paul Sunderland, Ash Grove Lime and Portland Cement Co., Kansas City, Mo.

Region 13—George E. Robinson, Austin White Lime Co., McNeil, Tex.

Region 14—Adda M. McMillin, Roche Harbor Lime and Cement Co., Roche Harbor, Wash.

Region 15—D. M. Kerr, Kaiser Aluminum and Chemical Corp., Salinas, Calif.

President's Report

President Wallace E. Wing opened the convention by saying that the association has laid sound foundations for progress as it enters its second half cenutry. He commented specifically on work done by the committee on percentage depletion and in the development of new markets that will increase tonnages of lime considerably. Use of lime in building construction was pointed to as a weakness that presents a challenge to the industry. Dry wall construction has cut in on the use of lime for plaster and mortar.

Mr. Wing considers the annual operating meetings very successful but anticipates that they will increase in value in proportion to the willingness of producers to exchange operating data and other production information.

The association approved a budget for the coming year that is the highest yet. Rate of dues has not been increased but volume of sales has increased to provide greater funds for operations. Approximately 40 percent of the budget will be for research, promotional and educational activities.

A special assessment had been made for tax activities including percentage depletion the past year but this has not been extended even though tax counsel has been retained on a permanent basis.

A percentage depletion symposium

was held. There were discussions by J. Milton Cooper, N. L. A. tax counsel, and Ralph L. Dickey, followed by questions and answers with the entire N. L. A. tax committee. There wasn't much new to report since no regulation had yet been issued in Washington and the need for clarification on many points continues. Members of the committee suggested that any doubtful questions that arise in connection with the handling of percentage depletion in tax returns be referred to the committee, which is setting up a plan to send out current information on the subject.

Resolutions

Appropriate resolutions were passed in memory of six men who passed away during the past year. They are J. A. Dunaway, Peery Lime Co., N. Tazewell, Va., who had served as a member of the board of directors and executive committee; T. R. Ellerbeck, Utah Lime and Stone Co., Salt Lake City, Utah, a member of the board; John P. Sheehan, The Atlas Lime Co., El Paso, Texas; Anthony McNamara, Eagle Rock Lime Co., Eagle Rock, Va.; Homer P. Brown, Diamond Springs Lime Co., Inc., Diamond Springs, Calif.; and W. Vernon Brumbaugh who had served on the association staff from 1926 to 1944.

General Manager's Report

General Manager Robert S. Boynton presented an excellent report in review of the past year's activities of N.L.A., and his views of the outlook for the industry are optimistic. The fact that the industry did not overexpand its productive capacity during a period when many industries did was pointed to as very favorable to continued good business for lime manufacturers. Whereas many industries will have to be content with lower profits in spite of greatly increased

New president and chairman of the board of directors, Amos B. Miner, Nation Gypsum Co., Buffalo, N.Y.

volume of sales, with the result that marginal plants will suffer, the lime industry has only added 750,000-800,000 tons of annual capacity (15 percent) since the start of the Korean war. This figure does not include dead-burned dolomite.

Another reason for Mr. Boynton's optimism is that certificates of necessity are still being issued for new plant facilities of lime-consuming industries, the present rate indicating that new demands for lime will be at least for 350,000 tons annually. In addition there are markets being created for lime which will enlarge demands, among them its use for flux in the steel industry, in the treatment of water and trade wastes, and for road stabilization. The association's contributions to this optimism have included its efforts to discourage overexpansion and its assistance in providing promotional material, and in obtaining certificates and priorities.

Standing at the speaker's table are four of the main speakers. Left to right: John C. Thornton, The Detroit Edison Co., Detroit, Mich.; Ivan F. LeGore, manager, Accident Prevention Bureau, Portland Cement Association, Chicago, Ill.; Prof. Walter C. Voss, M.I.T., Cambridge, Mass.; and Chester McDowell, Texas Highway Department, Austin, Texas. Seated, left to right: Robert S. Boynton, general manager of N.L.A.; president-elect, Amos B. Miner, National Gypsum Co., Buffalo, N.Y.; and presiding officer K. L. Hammond, Keystone Lime Works, Inc., Keystone, Ala.

Captive lime production continues a challenge to the industry, and has amounted to an average of some one million tons annually over a 25-yr. period. High transportation charges are one of the inducements which have made captive lime production look attractive to some users. The commercial lime industry's answer to this challenge, said Mr. Boynton, must be high quality of product, good service and reasonable prices. Another serious problem touched upon was the extremely high cost for capital equipment which has increased by 150 percent over a period when prices for lime had only increased by 40 percent.

Mr. Boynton summarized the principal significant developments of the past year and the activities of his office. Percentage depletion benefits to the industry have been substantial. The association has retained a tax lawyer on a permanent basis, since amendments to the percentage depletion laws are imminent and will be a continuing threat of concern to the industry.

Commenting on the association's fellowship in the Toledo University Research Foundation, Mr. Boynton said that the research in the use of lime as a replacement for cement in autoclaved concrete products is turning out favorable to the lime industry. He pointed to a growing demand for autoclaved concrete products as justification for a job of creative selling. Lime for this use would be sold in bulk. Results of the research are to be publicized by the association.

Use of quicklime as flux for injection into steel blast furnaces, first reported on as a potential market a year ago, has been tried on a practical basis during the past year but it is still too early for definite conclusions. However, Mr. Boynton said that the potential in this use is far greater than the early predictions of a three to four million annual ton potential. This development is to be followed closely.

With more steel production available and with growing demands for cleaner streams, the use of lime for chemical treatment of industrial wastes is expected to grow. Lime stabilization for roads is progressing slowly but steadily. Twelve states have now had experience with its use, which started in Texas where good results are being obtained. Use of lime for this purpose has been aggressively promoted by the association, which has recently been active in developing an A.S.T.M. specification covering this use.

Professor Walter C. Voss, upon his retirement from Massachussetts Institute of Technology (July 1, 1953), has been engaged by the association to write a series of articles on the use of lime mortars in masonry which will be published in architectural trade journals.

The annual operating meetings and

their value were discussed. The 1953 meeting, October 12-14, at Birmingham, Ala., will be the first full-fledged meeting to be held in the deep South.

Membership continues to grow and represents well over 75 percent of the industry tonnage. The goal is for 90 percent and Mr. Boynton reported that the outlook is good for new members. He then discussed the program and concluded by expressing his thanks to the board of directors, the officers, committees and staff for their continued help and cooperation.

Safety

Kent Jander, chemical engineer of N.L.A., in announcing the winners of the 1952 N.L.A. safety contest, had a good report on progress made. A record-making number of plants won awards with all 18 of the winning plants having perfect, no lost-time accident records throughout 1952.

In addition to plants winning certificates of honor, there were 34 other plants entered in the competition which was a great increase when compared to recent years. The peak was 61 entrants in 1943.

Lime plants winning certificates of honor in the four classifications were as follows:

Class A (1) for lime operations with both quarry and calcining plants working 100,000 or more man-hours.

G. & W. H. Corson, Inc., Plymouth Meeting, Penn., plant—351,520 man-hours

The Kelley Island Lime and Transport Co., Gibsonburg, Ohio, plant—275,255 man-hours

National Gypsum Co., Luckey, Ohio, plant—186,472 man-hours

The J. E. Baker Co., Ohio plant—148,232 man-hours

The Standard Lime and Stone Co., Knoxville, Tenn., plant—109,824 man-hours

Class A (2) for lime operations with both quarry and calcining plant operating less than 100,000 man-hours.

The J. E. Baker Co., Thomasville, Penn., plant—70,952 man-hours

Grand Canyon Lime and Cement Co., Nelson, Ariz., plant—55,960 man-hours

Rockwell Lime Co., Manitowoc, Wis., plant—45,131 man-hours

Louisville Cement Co., Milltown, Ind., plant—39,851 man-hours

Shank and Etzler Lime Co., Frederick, Md., plant—19,000 man-hours

Class B—Lime operations with both underground mine and calcining plants.

National Gypsum Co., Kimballton, Va., plant—367,553 man-hours

The Standard Lime and Stone Co., Bakerton, Penn., plant—278,698 man-hours

Marblehead Lime Co., Hannibal, Mo., plant—93,404 man-hours

Marblehead Lime Co., Marblehead, Ill., plant—48,596 man-hours

From left to right: Mr. and Mrs. V. F. Nast, Jr., The Western Lime and Cement Co., Milwaukee, Wis., Mr. and Mrs. Walter C. Voss, Cambridge, Mass.; Dr. and Mrs. Fred Gaenslaen, The Western Lime and Cement Co., Milwaukee, Wis.; Mr. and Mrs. V. F. Nast, Sr.; and Mr. and Mrs. Chester McDowell, Austin, Texas

Left to right, from extreme left: Don Johnson, Washington, D.C.; Miss Betty L. Reger, N.L.A.; Congressman S. Walter Stauffer; Mike Brisch and son, Rockwell Lime Co., Manitowoc, Wis.; the editor; John M. Deely, Lee Lime Corp., Lee, Mass.; and E. G. S. Thyer, Knibbs & Thyer, England

Starting at extreme left (left to right) are: Philip L. Corson, G. & W. H. Corson, Inc., Plymouth Meeting, Penn.; Fred Witmer, Jr. The Ohio Hydrate and Supply Co., Woodville, Ohio; Mrs. J. P. Feiser; G. I. Purnell, Warner Co., Bellefonte, Penn.; J. P. Feiser, Le Gore Lime Co., Legore, Md.; Mrs. G. I. Purnell; William A. Parson, Rutgers University; and G. I. Wiest, Warner Co., Philadelphia, Penn.

Left to right: Franklin Witmer, The Ohio Hydrate and Supply Co., Woodville, Ohio; Ross R. Worthington, International Paper Co., New York, N.Y.; Allen G. Clarke, International Paper Co., Atlanta, Ga.; Gladys L. McBee; Robert S. Boynton; Mr. and Mrs. Fred Roner; Mrs. Robert S. Boynton; and Mr. and Mrs. Richard D. Hook

Left to right: J. S. Offut, United States Gypsum Co., Chicago, Ill.; W. H. Moores, The Moores Lime Co., Springfield, Ohio; Mr. and Mrs. L. M. Bergford, Cutler-Magner Co., Duluth, Minn.; Paul LaLiberte, Cutler-Magner Co., Duluth, Minn.; and Mr. and Mrs. R. M. Slater, Ash Grove Lime and Portland Cement Co., Kansas City, Mo.

Class C—Lime calcining plant without associated quarry or mine.

The Dow Chemical Co., Ludington, Mich., plant—128,075 man-hours

Ash Grove Lime and Portland Cement Co., Springfield, Mo., plant—72,947 man-hours

Cutler-Magner Co., Duluth, Minn., plant—69,361 man-hours

A program of action to reduce accidents was outlined in an excellent talk, "Industry Safety Programs," by Ivan F. LeGore, manager, Accident Prevention Bureau, Chicago, Ill. In introducing Mr. LeGore, presiding officer K. L. Hammond pointed to the record of the portland cement industry which has reduced its accident frequency to 4.2 and severity to 1.8 for one of the finest records in all heavy industries. Figures for the lime industry are 22.8 and 3.1, respectively.

Mr. LeGore started out by citing figures which reveal accidents in this country to be the second largest cause for deaths. Disease comes first and deaths from war are third. The development of modern, complicated machinery and step up in the tempo of modern living have unleashed forces which have increased hazards which formerly did not exist, he said. When the modern safety movement started some 36 years ago, accidents were expected but now progressive companies believe that men are the most important consideration in production. It is being recognized more and more that money paid out for accident claims and medical costs is pure waste and of such magnitude that it pays to eliminate them. Accident prevention means conservation of resources

Three would-be golfers. Left to right: Frank R. Dittoe, The Kelley Island Lime and Transport Co., Cleveland, Ohio; J. Gilmore Wilson, Warner Co., Devault, Penn.; and G. J. Wiest, Warner Co., Philadelphia, Penn.

which, according to Mr. LeGore, pays a big return in profits and in improved morale.

Mr. LeGore mentioned the records in accident reduction achieved by the railroads, the steel and portland cement industries as examples of what can be accomplished through accident prevention. The Portland Cement Association record reveals an 87 percent reduction in accidents and deaths. Such results were achieved through a humane and planned approach which included mechanical safeguards, education and training in safety.

Mr. LeGore said that the record has proved that the more safety a company buys, the less it costs for it. A program must be set up for continuity of effort and recognition that production comes from people, who therefore are more important than machinery.

Safety is inseparable from production and improves efficiency, he stressed, and an accident really is a symptom that something is wrong in production. An accident reflects on the worker, on the supervisor and on his superiors. Top management must be behind any successful program. The line of operating personnel must handle a program, making the same men directly responsible for production and safety, but responsibility is not for any one man but must be shared by a number of men in any organization. Effective direction is required and a safety organization should be simplified in order to avoid confusion.

In conclusion Mr. LeGore stressed that the prevention of accidents, while justified in dollars, must be done as the right thing to do, and he said that if a company cannot afford safety it cannot afford to be in business. Details of the P.C.A. program were offered as available to help the N.I.A.

Neutralization

"Lime: Ubiquitous Neutralizing Agent" was the title of a paper presented by Richard D. Hoak, Senior Fellow, Mellon Institute of Industrial Research, Pittsburgh, Penn. This paper was presented as a contribution from research that has been sustained at Mellon Institute since 1938 by the American Iron and Steel Institute, and thoroughly covered the subject. Among topics covered were the important factors in neutralization economy, the influence of calcination practice on reactivity, magnesian and dolomitic limes, the effect of proper slaking on reactivity, the problem of sludge volume, and neutralization techniques.

(More complete information covering this important paper will appear in a later issue.)

Trade Waste Fellowship

William A. Parsons, research assistant, Rutgers University, New Brunswick, N. J., in reporting on the association's trade waste fellowship, confined his remarks largely to studies being made on acid precipitation. The second subject studied under the fel-

Left to right: E. I. Williams, Riverton Lime and Stone Co., Riverton, Va.; Mrs. Burton A. Ford; Mr. and Mrs. K. L. Hammond, Keystone Lime Works, Keystone, Ala.; Russell Rarey, Marble Cliff Quarries Co., Columbus, Ohio; and Burton A. Ford, St. Regis Sales Corp., Allentown, Penn.

lowship is on the dewatering of acid wastes.

Mr. Parsons' report was very technical and emphasized attempts to control after-precipitation following sludge precipitation including the use of a process of seeding crystals to the solution.

Oil Wastes

Don E. Bloodgood, Professor of Sanitary Engineering, Purdue University, presented a short report on the oil wastes fellowship at Purdue. He gave a history of the project and outlined some of the principal problems faced in determining the mechanics of emulsified oil coagulation. Adsorption and absorption are under study and information is being developed the subject, of flocculation, setting, etc.

Lime Stabilization

Chester McDowell, Senior Soils Engineer, University of Texas, in his paper "Recent Developments on Lime Stabilization in Texas," presented data that were very favorable to the use of lime for road stabilization purposes. Mr. McDowell presented a paper before the association in 1948 when this was an entirely new field. At that time there seemed to be doubt as to the durability of lime stabilized roads, but Mr. McDowell has since made a study of the behavior of the early experimental roads with emphasis on the degree of durability and also had data on newer projects that were very favorable.

His conclusions are that a high degree of performance is likely provided that certain practices be followed. Emphasis must be given to proper construction methods. Adequate depth is required so as not to overstress the subsoil. There must be an adequate cover thickness over the lime layer and the proper lime content must be used.

The original experiments in the Austin, Texas, district were discussed. Slides of some of these roads showed that they still are almost perfect after eight years. Compressive strengths had been taken of specimen cores. They showed 200 p.s.i. at 20 days, 600 p.s.i. after two years and 800 p.s.i. at eight years. Some of Mr. McDowell's slides showed how non-stabilized sections had to be patched whereas adjoining lime stabilized roads had no patches after 7½ years. In areas where red clay in the gravel caused failures, lime stabilization contributed to roads which have performed entirely satisfactorily.

Lime content was varied in test sections. In one section of plastic soil, 12 percent lime has yielded compressive strengths still increasing beyond 1400 p.s.i. Richer lime mixes with clay soils generally result in important increases in compressive strength with age. Important economics have resulted in certain areas because the cost of lime is actually less than for the sand layer which would otherwise have to be laid. Mr. McDowell presented a lot of detailed data in describing the various studies.

Mr. & Mrs. John S. Schirm (left), Grand Canyon Lime and Cement Co., Los Angeles, Calif., with Mr. and Mrs. Claude H. Barrick, S. W. Barrick & Sons, Inc., Woodsboro, Md.

Masonry Research

John C. Thornton, architect, The Detroit Edison Co., Detroit, Mich., in a paper entitled "Masonry Research Developments," summarized findings from original research on the relation between bond and the surface physics of masonry units. The paper was an abstract of one presented before the American Ceramic Society in 1952 summarizing more than a year of research following discovery that many brick had high capillarity on rough or sanded surfaces and little or none on others.

Bond tests disclosed a direct relationship between the kind of surface on a unit and the amount of bond. Experiments with chimneys and wells showed that leakage and extent of dye penetration coincided closely with the previous laboratory bond tests. It was also shown that there was good bond and almost no dye penetration with smooth brick which had little or no capillarity, that bond decreased and dye penetration increased according to the surface, and that as the capillarity of the surface increased the bond decreased. The effect caused by the surfaces of masonry units proved much greater than differences between mortars in respect to bond.

This research has caused Mr. Thornton to question the belief that had prevailed, that a rough surface gave a better bond. Rather, leakproof walls can be achieved with smooth bricks.

(Continued on page 102)

Left to right: William Avery, Pit and Quarry, Chicago, Ill.; Bolton L. Corson, G. & W. H. Corson, Inc., Plymouth Meeting, Penn.; Mrs. Kennedy Ellsworth; C. C. Loomis, New England Lime Co., Adams, Mass.; Kennedy Ellsworth, U. S. Lime Products Co., Los Angeles, Calif.; and Frank R. Dittoe, Kelley Island Lime and Transport Co., Cleveland, Ohio

Starting at extreme left (left to right) are: Wallace E. Wing, Marblehead Lime Co., Chicago, Ill.; Mrs. Amos B. Miner; Ralph L. Dickey, The Kelley Island Lime and Transport Co., Cleveland, Ohio; Mrs. Paul Sunderland; president-elect Amos B. Miner, National Gypsum Co., Buffalo, N.Y.; Mrs. Wallace E. Wing; Paul Sunderland, Ash Grove Lime and Portland Cement Co., Kansas City, Mo.; and Mrs. Ralph L. Dickey

Theory and Practice of

LIME MANUFACTURE

Part V. The Azbe stone chart—an aid to stone selection with respect to calcining rate and separate use of kilns for large and small stone

By VICTOR J. AZBE*

IN THE PREVIOUS SECTIONS of this series we considered influences affecting the speed of calcination of limestone; such as, effect of temperature difference between the core of the calcining stone and the flowing gases, and effect of stone size and stone shape and corresponding surface exposure to heat. A relationship of these was established which would hold true for a particular stone, this being expressed as a calcination constant devolved from the following equation.

$$\text{Calcination Constant} = \frac{\text{Surface Sq. In.} \times \text{Temp. Diff. deg. F.} \times \text{Tim. min.}}{\text{Volume Cu. In.} \times \text{Penetration (Inches Mean)}}$$

The surface, temperature difference, and time promote the calcination rate, while the volume and required penetration depth of the zone of calcination impede it. In the equation, the time has a single effect, and the temperature difference also has a single effect. The volume on the other hand has a multiple effect, since the less the volume the less heat needs to be transferred, the more surface there is for transfer, and the less is the depth to which it needs to penetrate. It thus is evident that the size of stone has the predominating effect.

Temperature is an important factor, of course. The higher the temperature the higher is the heat transfer rate, but that may be also attained by higher gas velocity. Also, the smaller the stone the lower the temperature would have to be. Then, while temperature is important, it must not be misconstrued. It is not the temperature of the hot zone that counts for so much, but rather the mean temperature difference through the whole kiln. For an efficient kiln, this mean will be low, since if it is not low, exhaust temperature will be high and the kiln will not be thermally efficient.

We can manipulate the kiln hot zone temperature to an extent, but not the mean temperature through the kiln when kiln is an effective kiln. A good cooler will deliver highly preheated air to the kiln hot zone which will raise the temperature, and this is a fundamental requirement of all efficient lime kilns. Turbulent admittance of combustible and its good distribution will raise it also through more rapid combustion, but this has mainly a local effect, following which the gases cool off rapidly and some distance above the combustion level, temperature is low.

High temperature may also be attained by delaying the drawing of the lime, creating, say, an athermal zone of little heat absorption capacity. This helps the calcination of residual core in the oversize pieces, but at a cost otherwise. It would be far better were oversize pieces not there. Then unduly high temperature would not be necessary, which brings us back to the size of the stone. The smaller the stone, the greater the surface, the lower the required temperature, the shorter the necessary time, the more active is the lime. Often stone of poor quality can, under these conditions, give a relatively good lime. Theoretically, the smaller the stone the better, but practically there are limitations.

This all is an exceedingly important subject and the basis of this new concept of lime manufacture. In the previous sections, Fig. 14 revealed that stone of a certain size, if it remains intact, would require 100 hours to be calcined completely in a good kiln, and other stone may require only ½ hour, or less, even 0.1 hour if we knew how to build kilns for these minimum sizes. With this section we delve deeper into the subject.

Drawing and Charging Practice

The charging of limestone to vertical lime kilns, in respect to its range of sizes, is about as irrational as anything that may still be found in the field of chemical engineering. In some plants stone of 1000 cu. in. volume and some that may be only 1 cu. in. are fed together. Then one wonders that core is found, and that in the same lime draw some of the lime borders on being dead-burned. No housewife would fail to carefully select or cut potatoes to size when expecting them all to be done at the same time. At the very least, if she did commit such an act, she would be wise enough to blame the result on herself rather than blaming it on the kettle as many lime men put the blame on to the kiln.

Even in plants where care is taken in this respect, small stone which calcines ten to fifteen times more readily is charged together with the large sizes requiring much more calcination effort in time and temperature. It is not only a matter of respective calcination rate. It is also that the small sizes reduce the voids among the large sizes, and usually do this irregularly. This in turn increases the draft demand, causes improper flame distribution and induces channeling of hot gases, which combine to impair kiln performance.

The aim of the lime producer is, of course, to use all of the quarry output in the production of lime as far as possible, but in doing so and apparently without completely realizing it, he greatly handicaps himself at the kilns. However, what is there that he can do, since no quarry normally will give as much as 50 percent of what could be considered kiln stone of truly good size range?

Thus the blame is not to be placed entirely on to the lime producer. The technical kiln designer must also share in it for not developing a satisfactory solution and a kiln for smaller stone, so that a wide range of sizes would not need to be charged as a mixture.

Design of Kilns for Small Stone

But the engineers have not been completely idle. Many kilns for small stone were devised and quite a number were tried. All had their faults and most were eventually abandoned, except the rotary kiln which, however, was costly, and complicated the plant. Small producers can not afford rotaries unless certain special conditions prevail.

The failures with vertical kilns for small stone resulted from the failure to fully appreciate the manifold complexities to which such a kiln is subject.

Since calcination of small stone can be accomplished quickly and at much lower temperature than large stone,

*Azbe Corporation, St. Louis, Mo.

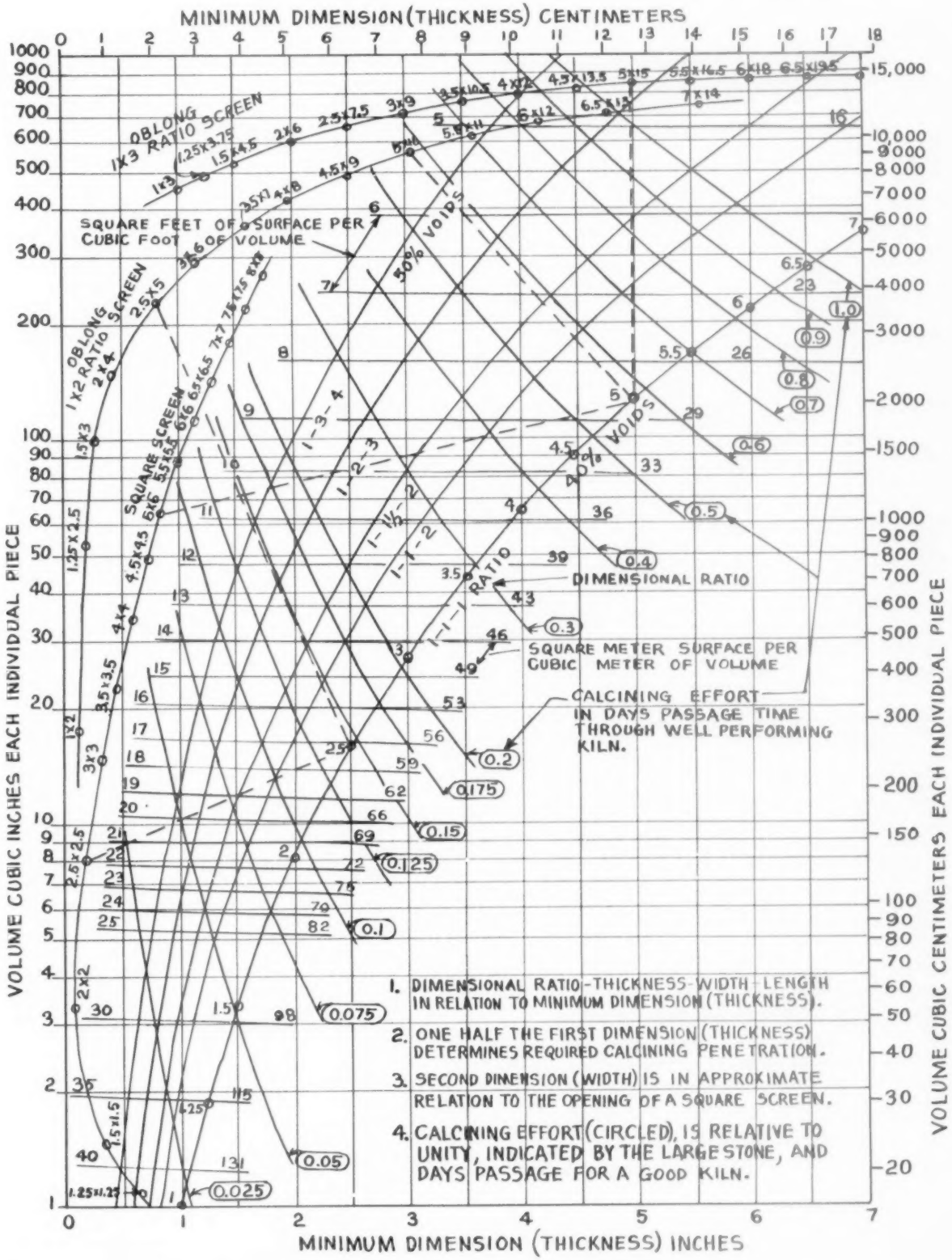

MINIMUM DIMENSION (THICKNESS) CENTIMETERS
MINIMUM DIMENSION (THICKNESS) INCHES
VOLUME CUBIC INCHES EACH INDIVIDUAL PIECE
VOLUME CUBIC CENTIMETERS EACH INDIVIDUAL PIECE
OBLONG 1X3 RATIO SCREEN
OBLONG 1X2 RATIO SCREEN
SQUARE SCREEN
SQUARE FEET OF SURFACE PER CUBIC FOOT OF VOLUME
50% VOIDS
40% VOIDS
1-3-4
1-2-3
1-1½-2
1-1-2
1-1-1 RATIO
DIMENSIONAL RATIO
SQUARE METER SURFACE PER CUBIC METER OF VOLUME
CALCINING EFFORT IN DAYS PASSAGE TIME THROUGH WELL PERFORMING KILN.
1. DIMENSIONAL RATIO-THICKNESS-WIDTH-LENGTH IN RELATION TO MINIMUM DIMENSION (THICKNESS).
2. ONE HALF THE FIRST DIMENSION (THICKNESS) DETERMINES REQUIRED CALCINING PENETRATION.
3. SECOND DIMENSION (WIDTH) IS IN APPROXIMATE RELATION TO THE OPENING OF A SQUARE SCREEN.
4. CALCINING EFFORT (CIRCLED), IS RELATIVE TO UNITY, INDICATED BY THE LARGE STONE, AND DAYS PASSAGE FOR A GOOD KILN.

Fig. 18: Azbe stone chart showing, in English and metric units, kiln heat absorption surface per unit volume and relative calcination rate for stone of varied size and varied dimensional ratios

it only was necessary to find and apply the essentials. This appears easy but it was not. It required many years' study of kilns and attendant physical processes before the full realization of these fundamental requirements. The successful kiln of today is a composite of collective experience with kilns of all sorts and contains design items from the many of some hundred patent claims allowed on kilns.

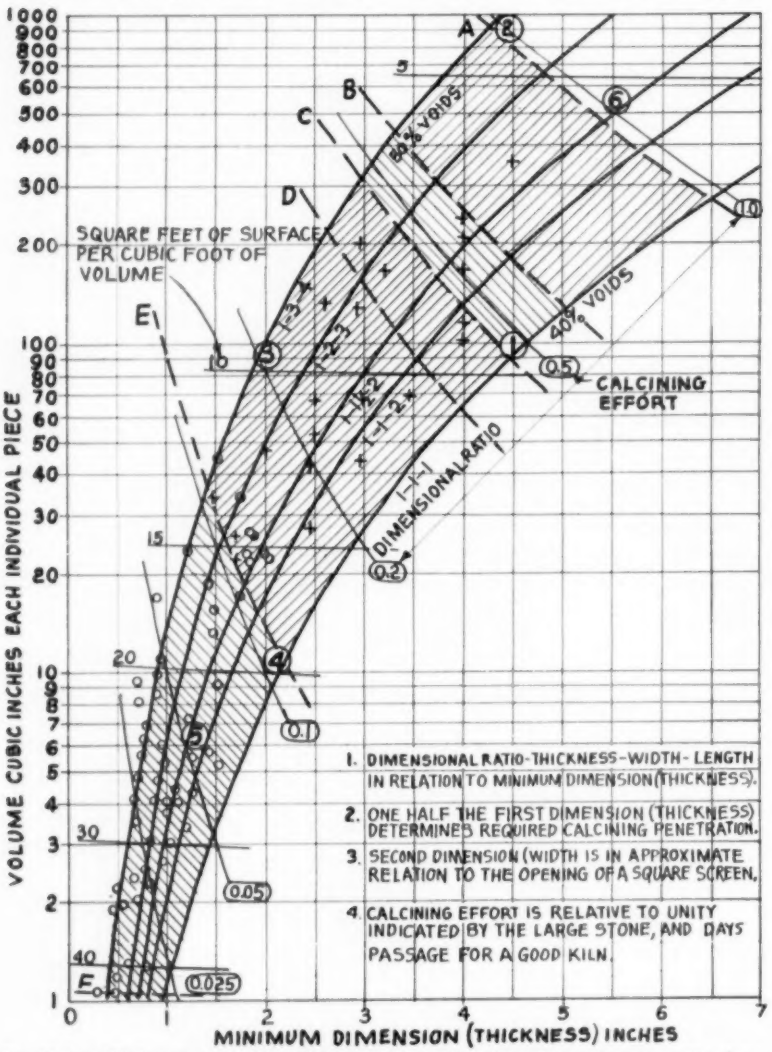
This paper, however, was not written to feature the kiln for small stone, but rather the importance of small stone burning in a separate kiln and avoidance of irrational feeding of wide range sizes to any one kiln. It was written to demonstrate that stone selection should be by "calcining effort" that may be required rather than by size. "Calcining effort" is a combination of temperature, time, and heat transfer rate. Lime can be made at 1300 deg. F. and even less if there is an infinity of time, if the calcining particles border on infinitely small size and CO_2 concentration is low. Thus the very small but exposed particles of lime in fluidized bed kilns are calcined in a short time at relatively low temperatures. We would say that calcining effort required is low, although the amount of heat basically required is the same as would be for any other stone size, or kiln system.

With stone increasing in size, the calcining effort necessary becomes greater rapidly, meaning that temperature has to be higher, time longer or heat transfer rate greater. The latter is accomplished through artificial increase of rate of flow of hot gases over the calcining stone surfaces by means of mechanical draft. The actual heating and calcination time periods required are directly proportional to the square of thickness. It would take four times as long for a thick slab as for a thin one of otherwise equal dimensional proportions. This is as expected, since the thicker slab contains twice as much material to calcine and the heat must penetrate twice as far.

Half-size stone has twice the area of outer surface in a given volume. Surface is double and penetration is only half, therefore small stone takes on heat four times as fast as stone twice the size. Calcining effort necessary is only one-fourth.

The bigger the stone, the higher is the temperature or the longer is the time required for its calcination. As both time and temperature affect the quality of the lime, the greater the calcining effort necessary, the poorer the lime is likely to be. Small stone calcined separately will give a more active, higher availability lime. However, exactly the opposite is the case if small and large stone are fed to the kiln in a mixture. Then, the lime of the small stone, having been subjected to excessive heat for an excessive time, gives a poorer lime, this being especially true with less pure stone.

To aid in rationalizing the stone-size selection, a "Stone Chart" was devised by the writer. This was recently further improved, and in its present form is of greatly increased usefulness. It is here introduced in a simplified explanatory form and quite completely developed. At first glance the chart appears complicated but a study of the following should clear it up.


SQUARE FEET OF SURFACE PER CUBIC FOOT OF VOLUME
VOLUME CUBIC INCHES EACH INDIVIDUAL PIECE
MINIMUM DIMENSION (THICKNESS) INCHES
CALCINING EFFORT
DIMENSIONAL RATIO
50% VOIDS
40% VOIDS
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B
C
D
E
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4. CALCINING EFFORT IS RELATIVE TO UNITY INDICATED BY THE LARGE STONE, AND DAYS PASSAGE FOR A GOOD KILN.

Fig. 16: Simplified explanatory form of stone chart showing absorption surface per unit volume and relative calcination rate for stone of varied size and varied dimensional ratios

Stone Shapes

Most stone is rather irregular, but it still will have three dimensions; that is, thickness, width, and length, thickness being its smallest or minimum dimension. These dimensions will be of varied ratio to each other. For a cubical stone they will be equal, which we may express as of 1:1:1 ratio. For a slabby stone, width may be three times the thickness and length four times which would be expressed as stone of 1:3:4 size ratio.

Stone may also be wedge-shaped tapering to knife edges. In such cases some judgment must be used in estimating dimensions, which should be more in the light of calcining readiness than their actual extent. Thus we know that sliver-like protrusions will calcine very readily and may be ignored as far as general bulk dimensions are concerned. The thickest cross sections will have the predominating influence.

On Fig. 16, location marked as (1) would represent stone of 4.5 in. minimum dimension or thickness and as this stone is an approximate cube it is located on the 1:1:1 stone dimension ratio line which passes through cubes of all the sizes.

Such stone would pass through a jaw crusher, which on the same set-

(Continued on page 85)

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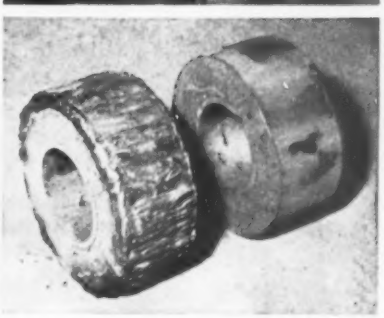

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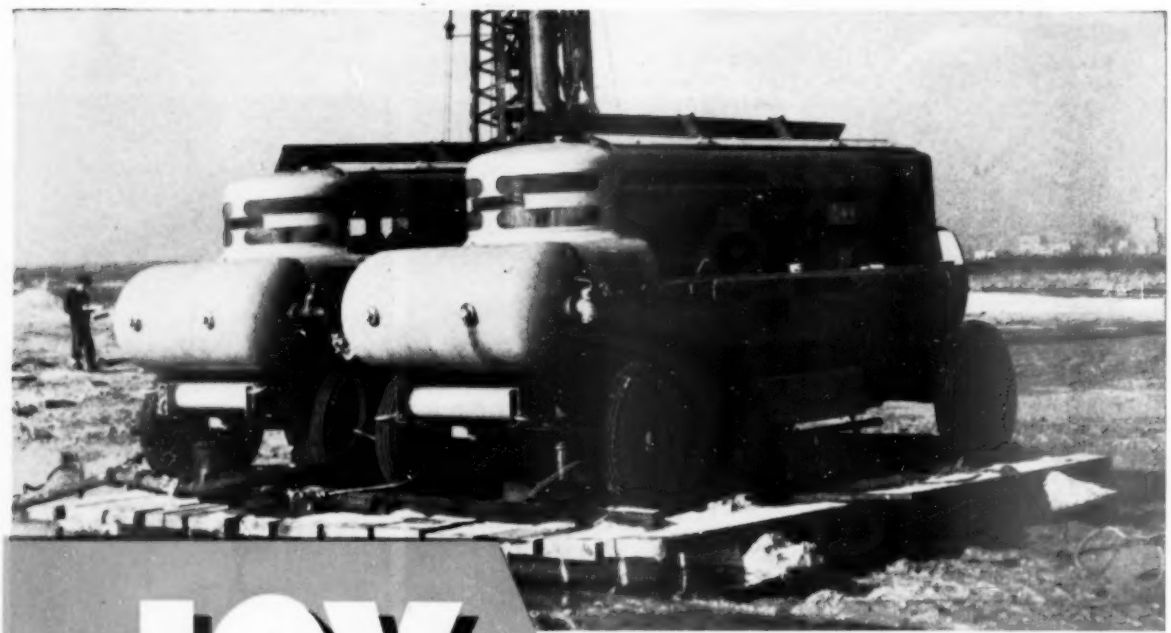

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ting may also pass a slab of 1:3:4 ratio, located at (2) on the chart. This stone would still have a 4:5-in. thickness, but the width would be three times this and the length four times; that is, stone would be 4.5 x 13.5 x 18.0 in.

From a vertical kiln standpoint, thickness is a very important dimension, as half of the thickness is the required calcining penetration. The more or less thickness the more or less calcining effort will be required, and the more or less there is a chance for core.

But although thickness is an important factor from the standpoint of calcining readiness, it is not the only factor. Entirely separate of this is the surface that the stone may present per cu. ft. of kiln volume, which would be indicative of how much heat it can absorb under any one given condition.

Slabby stone will have more surface than stone of cubic dimensions, but if of the same thickness the surface per cubic foot of kiln volume will be less. Thus as the chart shows, the cubical stone at (1), which is of 100 cu. in. volume will present a surface of 9½ sq. ft. per cu. ft. of kiln volume and by contrast, the slabby stone at (2), although of the same thickness will give only a little over 4 sq. ft.

The chart shows also that while the stone at (1) has a volume of 100 cu. in., stone of same thickness at (2) is ten times this, or of 1000 cu. in. volume. It is less likely for such a slab to slip between the crusher jaws.

There is an advantage to slabby stone. Although (2) is ten times as large as (1), the relative calcining effort necessary for (1), as shown by the chart, is only half as much as it would be for (2). If, however, the same volume of stone in the 1:3:4 ratio slab were consolidated into a 1:1:1 ratio cube, the size would be 10 x 10 x 10 in. and the calcination time would be more than four times that of (1) and more than twice that of (2).

However, needless to say, stone approximating (2) in volume, even if slabby, is too large for any kiln and particularly for any high capacity kiln. While occasionally such large slabs come through the kiln completely calcined, more often they have core.

If they do come through the kiln calcined, it is not a good sign. It only indicates that there is an overly hot section in the kiln, or retarded lime progress, or excessive regional gas flow, and that while the slab is being calcined, the normal sizes are being overburned.

For kilns intended to calcine large stone, a size such as of (1) is very good; that is, 100 cu. in. in size. If stone is slabby and still of this volume, it is even better; that is, stone as at point (3).

A stone in this category would have the same surface per cubic foot of kiln volume, but because such stone of 1:3:4 size ratio would be only 2 in. thick, requiring a mere one-inch of calcining penetration, the required calcination effort as indicated by the chart would be only 0.2 compared to 1.0 for the large slabs and 0.5 for similar volume cube.

If we move further down the scale of sizes, we find at (4) a stone sized 2 x 2 x 2 which would require only 0.1 the calcining effort of large stone. It is not reasonable that such stone should be charged together with the large stone requiring ten times this effort, but even smaller stone such as at (5) is charged often with the large of (6), with a calcining range between the two of 20 and even more.

In plants having a jaw primary crusher of say 6-in. opening, passing stone over 3-in. screen, it is usually said that stone to the kiln is 3 x 6 in., which it is not at all. It may be 3 x 10 in; that is, from 2 x 2 x 2 up to 5 x 10 x 15 in.

It is not only that the large size requires an extreme calcination effort. The small sizes act as obstructions, preventing free access of hot gases to the large stone, further hampering their already low calcination rate, a condition which cannot well be evaluated on the chart.

Crusher Settings

If the small stone is charged to separate kilns, it becomes permissible to use much smaller stone than is possible when charged in admixture with the large. That then allows closing down the crusher opening, without impairing quarry stone recovery for lime manufacture. It is better, however, to open up the crusher and to separate and recrush the oversize about as indicated by Fig. 17. Basically stone selection should not follow any screen size system or crusher opening. It should be predicated on the respective calcination rate of the stone, with the required calcining effort of the largest not exceeding five times that of the smallest passing to any one kiln.

Stone of the largest size on the chart of a relative calcining rate of 1.0, was desirable for the old type, low-capacity kilns because the quarries were hand-worked and kilns were all of natural-draft type.

The largest of the stone desired for the modern, high-capacity kiln with mechanically created draft is considerably smaller in volume and higher in surface. With most quarry

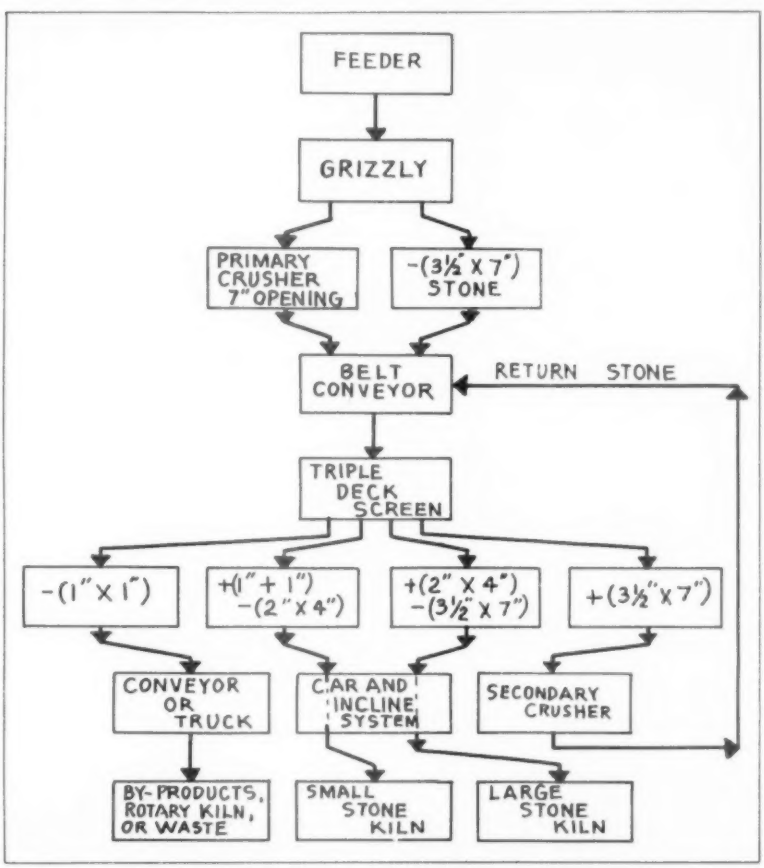


Fig. 17: Flowsheet for lime-kiln stone preparation

arrangements, there should not be over 0.6 calcining effort required; that is, never over 5 in. and preferably down to a 4-in. crusher setting.

The jaw crusher tends to give slabby stone and so, as the chart reveals, it is the right crusher for a lime plant because more kiln exposure surface is thus obtained, with the least amount of fines produced. But the slabs must not be too thick. Since slabby stone is desirable because lesser calcining penetration is required, and because it tends to give a bed of greater void percentage, the middle screen, that determining the upper size of stone charged to small stone kilns, should have rectangular openings; that is, with slots of 2-in. width to 4 or 5 in. in length. As indicated by the chart such stone would require a calcining effort of 0.1. Since this stone would be allowed to pass over a 1-in. screen, the lower rate of calcining effort would be 0.025 or ¼ of the upper rate. To use a rectangular opening screen for dividing the stone helps not only the kiln for small stone but the one for large stone as well.

The largest of the stone charged to any kiln should be of a size requiring not over five times the calcining effort of the smallest size passing to this kiln; and similarly for burning small stone, the difference between stone top size and minimum size should also be approximately this five to one range—an equitable division.

The whole question depends much on the manner that the stone breaks, on the quarry equipment available, on the kind of kilns and on the manner of kiln operation. There are two general aims; namely, the highest possible quarry output converted into lime and the best possible kiln performance in quality, capacity, and cost.

For natural-draft, low capacity kilns stone can be as large as shown on dotted line (A).

For mechanical-draft kilns of the center burner type, the largest stone properly should not exceed in size, dotted line (B).

If the plant has modern kilns for large stone as well as new ones for small stone, which satisfactorily calcine stone down to 1 cu. in., the crusher can be closed up for a maximum size (C).

If the quarry is arranged as in Fig. 17, and the large stone passes through a secondary crusher, the upper size limit can be reduced still further to (D).

The division between kilns designed for large and small stone sizes is (E), and all stone above (F) would be calcined in the kiln for small sizes. If the quarry stone preparation is as in Fig. 17, and if top size stone is limited to (D), then the large as well as the small stone can be burned in a kiln of the automatic continuous or semi-continuous draw arrangement. Such operations tend to produce the best lime with the least kiln labor and with a minimum of lime breakage in the kiln. That means the maximum of available pebble and lump lime with but a small amount of fines.

Dividing kiln stone with respect to its relative calcining rate makes for better kiln operation and for simpler, more practical kilns. Separate calcination of the major sizes opens up the charge, increases the voids, reduces the draft, greatly betters the capacity, improves gas distribution, reduces the fuel consumption, enhances the lime quality and reduces the fines. It improves quarry stone recovery, it reduces plant labor, increases the overall plant capacity and reduces the cost of lime. It improves the competitive status of the producer in respect to others having other kiln systems whether vertical or rotary.

Through the circles and crosses, Fig. 16 presents a specific example of kiln-stone division in a certain plant. Stone being charged to the "small-stone" kiln and also to the "large-stone" kilns is indicated thereon, and stone which is too large and should be subjected to secondary crushing is also shown. Any stone falling in the shaded section between (C) and (E) is proper for the "large-stone" kiln, while that below is suitable for the "small-stone" kiln. Stone above the shaded section is oversize. At the division between large and small there is some unavoidable overlap, but this does not matter too much.

The laws which govern the rate of calcination of stone in rotary kilns are different from those that govern its calcination in vertical kilns. The difference originates in the fact that in rotary kilns the surface of the stone does not become fully exposed to the heat of the kiln. Heat absorption is only along the upper surface of the lime-bed segment and along the surface in contact with the heated wall. Fundamentally, the main calcination motivating factor of the rotary is the temperature, while in the case of the vertical kiln it is the surface.

It is for this reason that the rotary kiln does not produce materially more lime when stone is of ¾ in. size, compared to 1½ in. size, even though the stone surface in the case of the latter is double and required calcining zone penetration only half.

A properly designed vertical kiln takes advantage of this and time required for heating and calcination of half-size stone is only one fourth. It does this because the surface of each individual piece of stone is absorbing heat from the gases, while in the case of the rotary kiln only the external surface of the entire collective mass does so.

Fig. 18 presents the completed form of the Azbe Stone Chart. It was prepared to be usable in both English and metric units. The calcining effort on this chart is relative to time of passage through a well-operated kiln in portions of a day. Thus a calcining effort of 0.5 means 12 hours of kiln time for a properly proportioned, high-capacity kiln. For poorer performing kilns time would be relative.

Screen Openings To Use

The chart also has a series of lines representing screen opening shapes including a square-opening screen, a rectangular opening screen of 1 x 2 side ratio and one of 1 x 3 side ratio. The dotted lines running from a 5 in. cube to the square-opening screen of 5 x 5 or the rectangular 5 x 10 and 5 x 15 opening screen shows about what sort of stone would be obtained evaluated in respect to its required calcining effort. The square-opening screen would throw out readily calcined stone, while the 1 x 3 side ratio rectangular-opening screen would pass excessive size slabs. The dotted line running from 5 in. to the 1 x 2 opening ratio screen; that is, 5- x 10-in. opening, runs close to 0.6 calcination effort line.

Plotting the sizes of stone fed to a kiln on the chart as demonstrated by Fig. 16, brings forth the rather impossible state that often prevails and leads to a more rational stone selection and division.

Re-emphasizing the foregoing, the ordinary practice of using stone in vertical kilns which has passed a 6-in. setting of a jaw crusher and over a 3-in. screen to remove the fines is wrong.

The largest of such stone may be 6 x 9 x 12 in., or even more, and the smallest, smaller than 1 x 3 x 3.5 in. The largest would have from 500 to 800 cu. in. of volume and the smallest only about 10, the large being as much as 80 times the small in volume. Occasionally, to save stone, the screen is even smaller than 3 in., and the largest of the stone may occasionally be as much as 1000 cu. in. or a hundred times the volume of the small and far more than this preparation in required calcination effort.

Quarry stone recovery and kiln performance are thus in conflict with each other. If the crusher is closed up to give better kiln stone there is an excess of smalls, for which there may or may not be an economic use. More often there is not.

There are two corrective alternates. One demands a double-deck screen and a secondary crusher, or a return circuit for oversize rock. The crusher then could be opened up more as the kiln stone would be sized both for the larger as well as the smaller portion. This would help the kilns and it would help the quarry. A second and better way would involve the use of a triple-deck screen, a secondary crusher, and a special kiln to calcine the smaller stone down to 1 in. size. In such a case the crusher could be

(Continued on page 90)

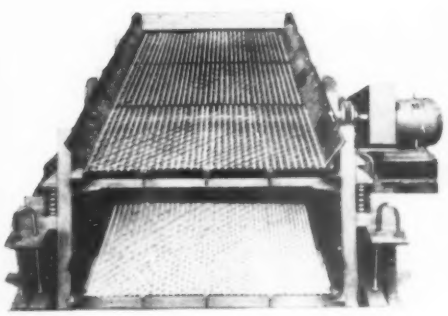
KENNEDY ROTARY KILNS, COOLERS & DRYERS

TOP THE FIELD!

...SECTIONALLY BUILT, ANY LENGTH OR DIAMETER

World-famous for strength, durability and economical operation, Kennedy Kilns combine many exclusive construction details with the latest approved engineering features.

Gear reducers driven by variable speed motors permit rotation of kiln at any desired speed. Riding rings, internally cooled, are mounted on self-aligning bearings for frictionless service. Made in single or multiple units in all lengths and diameters. Noted for uniform production and continuous operation with an absolute minimum of wear or time lost for repairs and maintenance. Send for literature.



VIBRATING SCREENS...

with one, two or three interchangeable decks!

Strong, efficient screens built for heavy duty sifting of a wide range of aggregates. Four-way vibrating motion handles all grades of rock and ore swiftly, effortlessly. Interchangeable mesh readily installed to accommodate any fineness of screening desired. Available in a range of widths and lengths, stationary or portable models.

Send for bulletin.

IT COSTS LESS.. TO OWN THE BEST!

KENNEDY - VAN SAUN

MANUFACTURING & ENGINEERING CORPORATION

TWO PARK AVENUE, NEW YORK

FACTORY DANVILLE, PA.

WE say the Allis-Chalmers HD-20 is designed to OUTPRODUCE, built to OUTLAST

But anyone can make claims . . . That's why we invite you to get the facts firsthand from HD-20 owners. Just call your nearby Allis-Chalmers dealer. He'll be glad to tell you where you can see these great tractors at work . . . where you can talk to the men who own or operate them. When you do, experience tells us you'll hear about these big benefits:

Hydraulic torque converter drive gives the operator the equivalent of hundreds of gear ratios in two speed ranges — automatically selects the proper speed for maximum production. With hydraulic torque converter drive, you take full advantage of available horsepower . . . even at creeping speed. And cushioned protection means fewer repairs . . . longer life of tractor and auxiliary equipment.

In dozing, pushing or shovel work, there's nothing like the HD-20 for sheer productive power. Torque converter actually multiplies torque up to four and one-half times . . . develops tremendous drawbar pull to start the load smoothly, and automatically accelerates to highest speed conditions permit, in either high or low range.

New design, new performance. The HD-20 is built to take it— with such design advantages as all-steel welded construction . . . balanced weight and power . . . extra heavy main frame. Hydraulic control permits steering this 20-ton giant with only the touch of a finger.

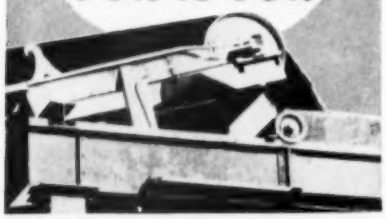
Easy to service, easy to maintain. 1,000-hour lubrication intervals for truck wheels, idlers, support rollers; no lubrication fittings under tractor. Major units are easily removed without disturbing adjacent parts; adjustments are simple.

See for yourself the many profit-making applications of the HD-20. Ask your Allis-Chalmers dealer to show you this outstanding tractor at work.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

41,000 POUNDS
175 NET ENGINE HORSEPOWER
GM 2-CYCLE DIESEL ENGINE

Cedarapids
Built by IOWA
Schrock
MOTORIZED HEAD PULLEYS
Slash
CONVEYOR DOWNTIME 70% to 90%



U.S. PATENT No. 3548399 — OTHERS PENDING

HERE'S WHY!

- No chains, sprockets, sheaves, out in the weather and dirt!
- No chain idlers to keep adjusted or oiled!
- No V-belts to be continually checked, adjusted and replaced!
- No shafts and drives to service and lubricate!
- No motors exposed to damage or weather!

Everything CONTAINED within the pulley!

IT'S *motorized* to eliminate expensive upkeep and cut downtime to the barest minimum on all belt conveyor or belt-bucket elevator operations. *All moving parts are inside the pulley,* enclosed and protected by the pulley shell from weather, dirt and damage. Operation is simple...the pulley shell rotates around the electric motor and reduction gears, which are held stationary by a torque arm attached to conveyor frame. Compact, easy to install, *economical* . . . get complete details from your nearest distributor, or write for Bulletin MP-1 today!

Built for sale in Arizona, California, Nevada, New Mexico, Southern Oregon, Southwestern Utah and Texas by

YUBA MANUFACTURING CO.
(Pulley and Sprocket Department)
Benicia, California

IOWA
MANUFACTURING COMPANY
Cedar Rapids, Iowa, U.S.A.

Lime Manufacture

(Continued from page 86)

opened still more, less fines would be produced, and of the fines, most would be calcined. Wastage of stone might not be over 10 percent and far less than in any rotary kiln installation.

Under such a system and the use of the automatic type, vertical kilns there would also be the minimum of lime as lump or pebble and the minimum for necessary hydrator disposal. Lime would be definitely of better quality, better burned, and with a minimum of core. When stone is friable by nature, or when fines are not desired at all, as in carbide operation, this system would be particularly advantageous.

(To be continued)

Labor Relations Trends

(Continued from page 41)

tagonizing hearings.

"(6) To have a thorough non-partisan study made by a presidential commission before recommending to Congress revisions that should be made in the Labor-Management Relations Act, 1947.

* * *

Only Public Members

"The presidential commission would be composed entirely of public members although it would include people of various backgrounds. Experience has shown that bi-partite or tri-partite bodies of this kind partake strongly of the nature of debating societies, with minds firmly made up in advance. In my short term with the Mediation Service I have experimented with the idea of separate discussions with representatives of industry and of labor on controversial matters, and the results have been far more satisfactory than with joint meetings. When the traditional reason for quarreling or disagreeing is removed, as when there is not present the opponent to whom, as a matter of principle, concessions are not customarily to be made, we find a gratifying amount of reasonableness. In such meetings, by way of illustration, I have found that most of the features of this program seem to be acceptable as worthy of trial."

Brazilian Cement Plant

CIA BRASILEIRA DE CIMENTO PORTLAND PERUS, Brazil, reportedly has received $2,000,000 worth of U.S. equipment for installation at its cement plant. The new facilities are expected to boost production to 700,000 bags per month and, by 1954, to 1,000,000 bags per month, which will make the plant one of the largest in the world.

Purchases Companies

ANDERSON SAND AND GRAVEL CO. and Sterling Ready Mixed Concrete Co., Sterling, Colo., have been purchased by Robert McAtee, engineer, Fort Morgan, Colo.

AMERICAN FORGE GRINDING BALLS

Heat treated Chrome-Moly or Carbon Steel
¾" to 5"

Try AFCO balls. See for yourself how they grind longer and more efficiently, how they reduce grinding ball consumption. Write, wire or phone NOW for prices.

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AMERICAN FORGE CO.

Executive offices and plant: Niles, Calif.
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Salt Lake City, Utah
6

Here's Why Bemis is Your Best Multiwall Paper Bag Source...

Since 1858, Bemis has SPECIALIZED in making bags. Bemis buys immense quantities of kraft paper and so can get the "pick of

the crop." Bemis laboratories are the watch dogs of paper

quality. Bemis engineers work constantly on new and better bags for diversified products. Bemis' twelve multiwall plants are

strategically located to give unexcelled service.

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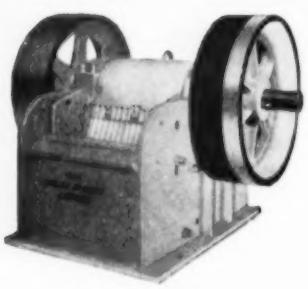
A 3 IN 1 ADVANTAGE

WITH TWINDUAL ROLLS

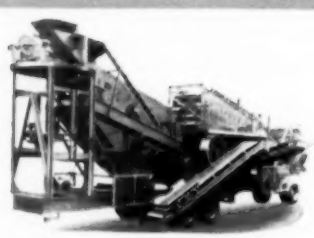
3 SEPARATE CRUSHING OPERATIONS IN 1 PORTABLE ROCK PLANT



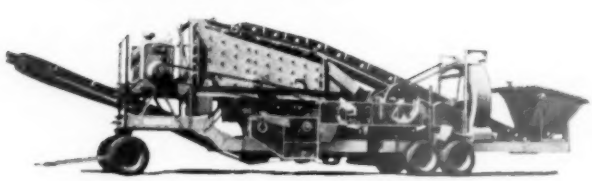
1ST. STAGE — Overhead Eccentric Jaw Crusher

Rock or gravel is fed by apron feeder to jaw crusher. Both feeder and jaws can be skid mounted for simple removal. Bar grizzly and by-pass relieves crusher of material not requiring primary reduction — reduces unnecessary wear and clogging. Pacemaker Jaw Crusher produces two distinct blows with each revolution of Universal's overhead eccentric shaft, famous in the industry for 47 years. Primary blow at the top of the jaw and secondary blow at the bottom. Force feed action and fast discharge results in high capacity, more production, top profits. Roller bearings are equipped with piston ring seals to keep lubricant in, dirt and grit out.

OTHER PROVEN UNIVERSAL PLANTS WITH THE EXCLUSIVE TWINDUAL ROLLS

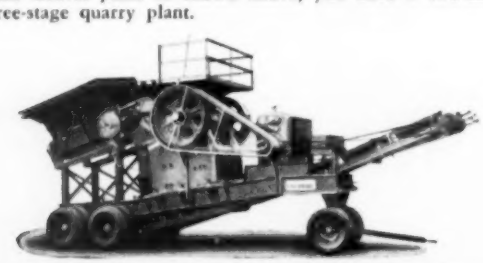


293QS Gravel King A complete portable gravel crushing, screening and loading plant with three stages of crushing, two separate screening operations. 1824 or 2036 RB jaw crushers.

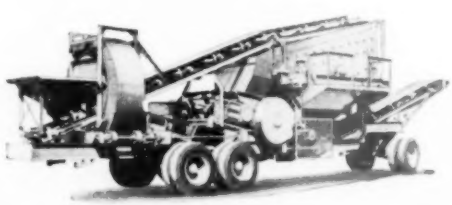


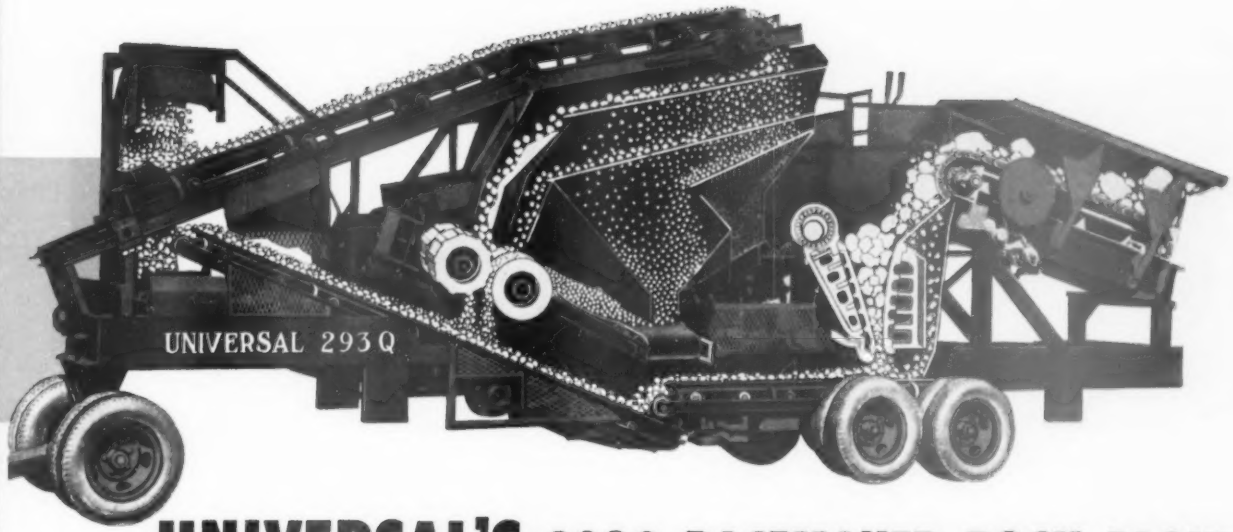
TDM24 Master Gravel Plant Especially profitable where a highly mobile, low weight plant is required for a top capacity, flexible operation. Three full stages of reduction. 1024 RB jaw crusher.

546P Portable Primary Crusher 1824, 2036, 2436 or 3042 RB Jaw Crushers. Combined with a TDS Secondary Twin Dual Gravel plant as shown above, you have a two-unit, three-stage quarry plant.



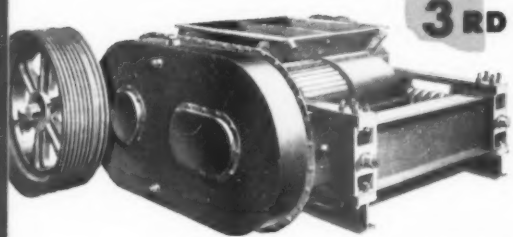
TDS30 - TDS40 Portable Secondary Plants Complete two-stage roll crushing, screening and loading plants. 30 or 40 inch TwinDual roll crushers.





UNIVERSAL'S 293Q PACEMAKER ROCK PLANT

2ND STAGE
3RD STAGE } UNIVERSAL'S Exclusive TwinDual Rolls



The roughing deck of the screen selects only the large oversize from the first stage of crushing and routes it to the roughing rolls of the Twin Dual Roll Crushers. Roll feed utilizes full width of rolls. 30% to 50% of the material crushed in this second stage is finished and removed when returned to the screen. 15% recirculates and the balance is reduced by the third stage. The finishing deck of the screen removes specification material resulting from any of the three stages of crushing. The oversize from this finishing deck is chuted to the finishing rolls of the Twin Dual Roll Crusher.

PLUS THESE UNIVERSAL ADVANTAGES

Portability . . . saves time in moving and setup, cuts operating costs on the job. Apron feeder and jaws can be skid mounted to obtain low rear axle weight.

Dependability . . . balanced construction, the even, steady flow of material at every stage of operation cuts "downtime" and maintenance costs.

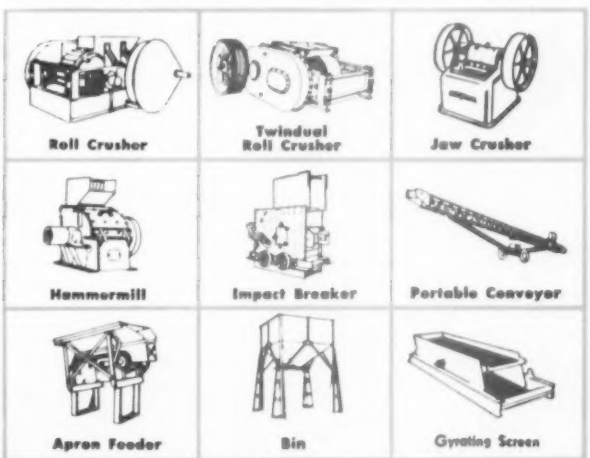
Capacity . . . again, **Balanced Construction,** big jaws, rolls, screens and conveyors feeding and discharging at capacity—produce maximum tonnage.

FOR TOP PROFITS BUILD WITH UNIVERSAL SOUNDLY ENGINEERED BASIC UNITS

Whatever your particular crushing, screening, washing, or loading problems might be, Universal equipment invites comparison. For information on the complete Universal line see your nearest Universal distributor or write UNIVERSAL ENGINEERING CORPORATION, 617 C AVENUE N.W., CEDAR RAPIDS, IOWA, a subsidiary of Pettibone Mulliken Corporation, 4700 W. Division Street, Chicago 51, Illinois.

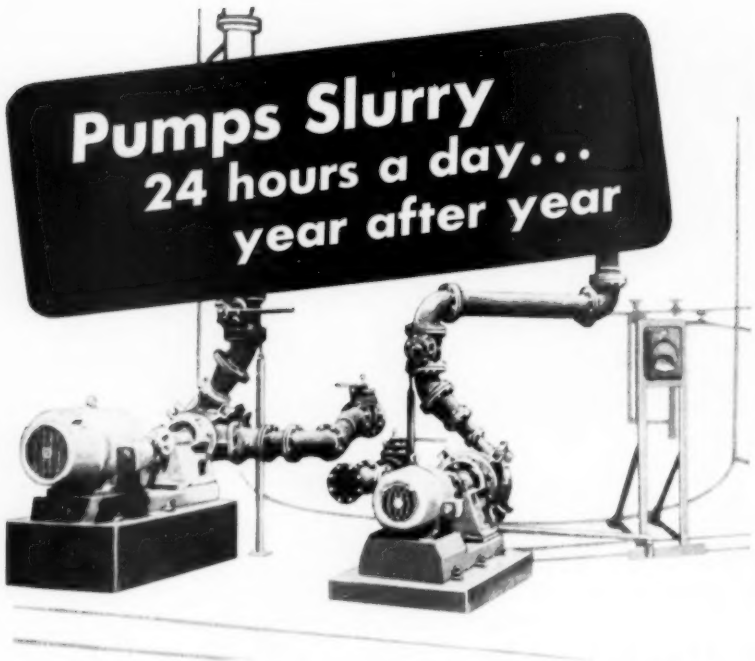
When you move, move quickly and easily with Universal Portable Plants . . . and you move on to greater profits.

Universal's 293Q Pacemaker Rock Plant is acclaimed by owners everywhere as a top producer in the field.



UNIVERSAL GAVE CEDAR RAPIDS ITS ORIGINAL FAME FOR QUALITY CRUSHERS **IN CEDAR RAPIDS SINCE 1906**

PMCD **UNIVERSAL** ENGINEERED FOR TOP OPERATING PROFITS



● MORRIS TYPE R SLURRY PUMP at the left is on continuous 24-hr. duty delivering 1000 GPM of a 17% lime slurry at 100' head. Fifty-HP motor operates at 1180 RPM. Intermittent-duty pump at right delivers 200 GPM at 50' head with 7½-HP motor turning at 880 RPM.

In slurry-handling operations, "long-term service" is a meaningless claim unless the pump will work day-in and day-out with a minimum of maintenance time, trouble and expense

Morris Type R Slurry Pumps—with an established reputation for longer life—also incorporate in their design exclusive features which result in easier installation . . . fewer interruptions to service...less overhaul...fewer replacements.

To provide uninterrupted service . . .

The gland is under suction pressure only. This reduces leakage and dilution . . . keeps harsh abrasives out of the stuffing box . . . practically eliminates packing troubles.

There are no internal studs or bolts. Caustic and corrosive solutions cannot seep past threads and cause maintenance headaches.

To make installation and dismantling easy . . .

Shell is interchangeable for right or left hand rotation. Suction and discharge nozzles can be rotated around the axis of the pump to a total of 72 different locations.

Impeller removed without disturbing the piping. You simply loosen 4 *outside* clamping bolts and pull off the end cover. This feature alone saves considerable time and labor.

● *Free Service.* Morris Engineers will be glad to recommend the pump best suited to your needs for size, capacity, etc. Send necessary data today . . . include request for Bulletin 181.

MORRIS MACHINE WORKS
Baldwinsville, N. Y.
Sales Offices in Principal Cities

MORRIS *Centrifugal Pumps*

Removing Kiln Rings

(Continued from page 67)

"How many industrial shells does it take and how long is the fire off?" is a question often asked. Our study has shown that the smallest number of shells used has been 26, and the greatest number 2375. Kiln downtime has been kept as low as 13 minutes, but this depends, of course, upon the hardness and consistency of the ring. Experienced shooting personnel and proper timing as to when to shoot are most important. Every kiln burner knows the idiosyncrasies of his kilns.

The predecessor of the present industrial gun, known as a cement or kiln gun, was first used in 1924. It was a far cry from the present rugged and efficient gun, but was used effectively until 1946 when the present gun was developed.

Present standard industrial shells have a three-ounce lead slug or projectile. This gives them the required weight, does not damage the kiln lining, does not contaminate the product, and reduces ricocheting. They develop a muzzle velocity of more than 1600 f.p.s. The slug or projectile has a muzzle energy of 7475 ft.-lb. Truly a powerful, penetrating blow. One cement plant reported that, in removing a ring, a test showed an average of one industrial shell used for each two tons of clinker in process at the time. Another plant reduced downtime in removing rings from 42 hours every three weeks and complete scrapping of material in the kiln at the time to less than ½ hour twice a week or approximately 2½ hours for the same period, with no scrapping or loss of materials.

Plans Gypsum Expansion

MELVIN H. BAKER, chairman of the board, National Gypsum Co., Buffalo, N.Y., at a recent stockholders' meeting announced plans to spend $18,000,000 for plant expansion and improvements in the next two years. Mr. Baker expressed his belief that the nation's economic levels will continue upward for the next several years and cited National Gypsum's sales growth from $22,000,000 to $100,000,000 in the past decade and said he saw no reason why the trend should not continue.

Gypsum Roads?

THE OKLAHOMA HIGHWAY COMMISSION is conducting field checks and laboratory tests on a 3-mile road serving U.S. Gypsum Co.'s Southard, Okla., plant, to determine the feasibility of using anhydrite, a gypsum product, in road construction. The anhydrite road, since its construction five years ago by U.S. Gypsum Co., has been traveled by 50 to 70 trucks per day, carrying loads averaging 70,000 lb. According to reports, the road has not deteriorated, and the sub-base has formed into a concrete-like mass.

NEW ROTARY BLAST HOLE DRILL

The BUCYRUS ERIE 50-R

Increases Drilling Speed

. . . . . .

Reduces Drilling Costs

Meet the Bucyrus-Erie 50-R . . . the new rotary member of the world's most famous line of blast hole drills. Designed for drilling 9- to 12-in. holes in quarries and mines, it's your solution to the problem of high preparation costs. Look at this list of star-studded advantages:

1. **FLEXIBILITY** in feed and rotation speed permits drill to work at maximum efficiency in various types of material . . . prevents bit deflection.
2. **SMOOTHER, MORE UNIFORM DRILL HOLES** greatly reduce loading time, enable you to set charges where you want them. Powder requirements are reduced.
3. **SPEEDIER BANK PREPARATION.** Drill bits are of the rotating-cone oil-well type. Cuttings are cleaned from the hole by air — your bit is constantly cutting virgin rock.
4. **NO WATER PROBLEM.** The 50-R drills dry. Costly piping layouts or expensive water haulage are eliminated. You need worry no more about winter's freezing temperatures.
5. **TOP MOBILITY FOR BETWEEN-JOB MOVES.** A self-propelled unit, the 50-R is mounted on crawlers, chain driven from the main machinery. Each tread is independently controlled by an air-operated friction clutch and brake.
6. **FAST, EASY SETUPS.** The all-steel, electric-welded 54-ft. derrick is raised and lowered by an electric motor. Three hydraulic jacks, 7 inches in diameter with a 42-in. stroke and capable of a 22-in. lift, raise and level the rig before drilling.

12853C

There are many more 50-R features you should know about. For complete information write us soon.

BUCYRUS-ERIE COMPANY
South Milwaukee, Wisconsin

this costs money

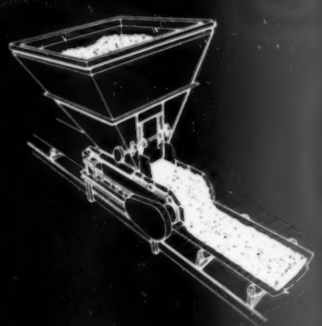
Underloaded conveyors cost you money because they are not utilized to capacity...you're not getting full return on your investment...subsequent operations are starved for materials.

this wastes money

Overloaded conveyors cause unnecessary cleanup...thus waste labor. Subsequent operations are periodically flooded with more material than they can handle.

this saves money!

A properly loaded conveyor, with flow to it regulated by a Rex® Feeder, is economical and efficient...promotes smoothness and economy throughout entire processing operation.



CHAIN BELT REX COMPANY®

Chain

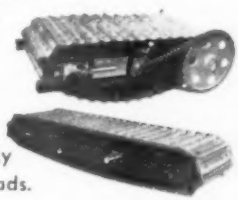
YOU save time, material, money with REX apron feeders!

Uniform, Regulated Flow...that's important when you're concerned with moving bulk materials from bin or hopper to belt conveyor or crusher. With Rex Feeders you're assured a metered, uniform rate of transfer, regardless of variation in size of material handled. Your belt conveyor or crusher will receive a steady flow of material to assure smooth, efficient, low-cost operation.

Here are some questions we are frequently asked concerning Rex Feeders. The answers tell you why there's no question about it—Rex Feeders are your economical, money-saving choice.

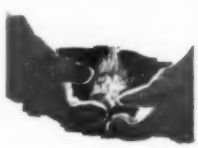
Q. *In what respects are Rex Apron and Pan Feeders superior to other feeders such as the vibrating type?*

A. Rex Self-Contained Apron and Pan Feeders require only a minimum of mechanical servicing rather than complicated electrical maintenance. Steep inclines are practical. Their efficiency is unaffected by varying loads.

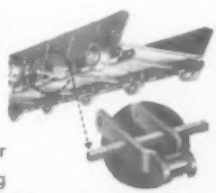


Q. *What temperature range can be handled successfully with Rex Apron and Pan Feeders?*

A. Existing installations are handling sintered, calcined, briquetted, nodulized and similar hot material fed to them as hot as 1900° F. Chain and carrying rollers are removed from intense heat zone. Localization of intense heat can be controlled.



Q. *What is the outstanding Rex advantage over other apron and pan feeders?*



A. The Rex Outboard Roller Construction is an outstanding advantage of Rex Feeders. Outboard rollers can be replaced without taking chain apart. Only ⅛ as many operations are required as when rollers are between side bars. Exclusive Rex Square Through Rods, seated in square holes in side plates, positively cannot rotate.

Q. *What types of material can be handled on Rex Apron and Pan Feeders?*

A. Any relatively dry loose bulk material...hot or cold. Some of those most commonly handled are:

- Coal
- Ore (Metallic, Non-metallic, Mineral)
- Clinker
- Sinter
- Limestone
- Sand
- Cement Rock
- Heavy Chemicals

Ask your Rex Field Sales Engineer to give you complete information on how you can save money with Rex Feeders. Call the office nearest you, or write to Chain Belt Company, 4649 W. Greenfield Ave., Milwaukee 1, Wis.

Belt COMPANY OF MILWAUKEE

Atlanta • Baltimore • Birmingham • Boston • Buffalo • Chicago • Cincinnati • Cleveland • Dallas • Denver Detroit • El Paso • Houston • Indianapolis • Jacksonville • Kansas City • Los Angeles • Louisville • Midland, Texas • Milwaukee • Minneapolis • New York • Philadelphia • Pittsburgh • Portland, Oregon West Springfield, Mass. • St. Louis • Salt Lake City • San Francisco • Seattle • Tulsa • Worcester

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Distributors located in principal cities in the United States and abroad

"There's an Insley working near you"

INSLEY

The Insley Manufacturing Corp. of Indianapolis has been manufacturing construction equipment since 1907. The Insley Line includes excavators and cranes, 5 to 30 ton capacity—rubber or crawler mounted—gasoline, diesel or electric powered. There's an Insley working near you.

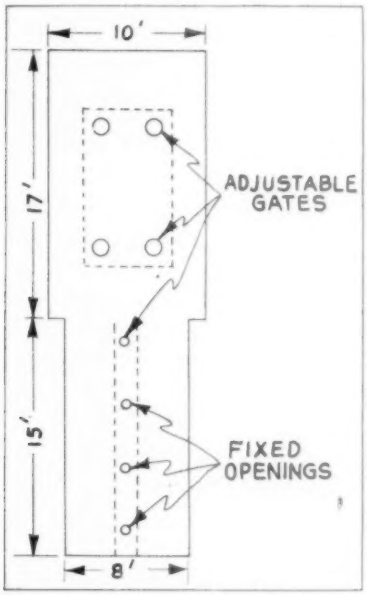
"There's an Insley working near you"

Operates Five Plants

(Continued from page 71)

age at both plants. Near Ramsey the company has a large and well equipped shop where repair work is done for all plants.

The general practice at both plants is to strip at night and cast the strippings back into worked out portions



Plan sketch of large sand settling box at Jay Ray No. 2 plant

of the pit. The same dragline loads day shift. The plants have a capacity in the 175 t.p.h. range.

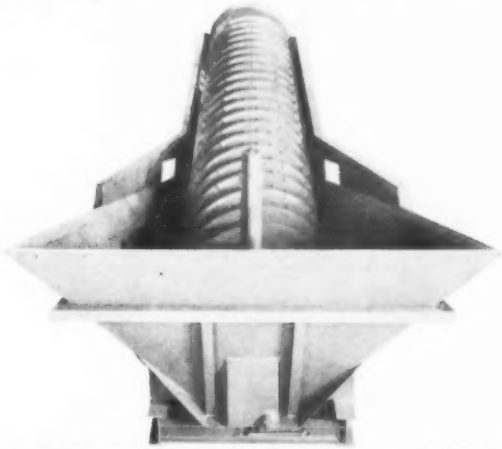
The Jay Ray No. 1 plant screens and crushes with the assembly mounted on industrial tracks for movement. The country is relatively flat and the rails parallel the pit operations. Cars are loaded direct from the screen with no bins.

The weight of these plants is an important factor, and the capacity of the jaw crusher is usually the bottleneck for greater productivity. An increase in crushing capacity (without an increase in plant weight) of as

(Continued on page 100)

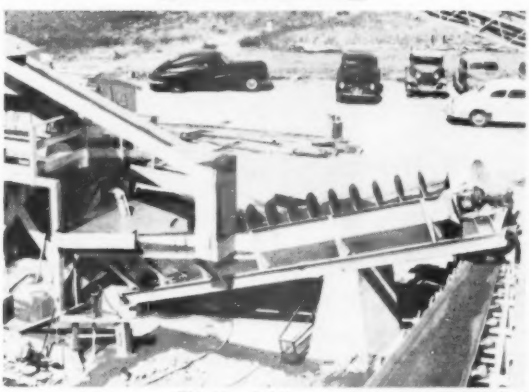
Roll crusher, to the left, and jaw crusher, center, at La Grange plant

Why do so many operators prefer



WEMCO SAND PREPARATION MACHINES?

In recent years—since the introduction of modern designed Wemco Sand Preparation Machines—more and more operators have expressed their preference for Wemco units. Proof of their preference is shown by the large number of repeat orders. But what are the reasons? In general, operators name these three:



This No. 48 Wemco unit produces 100 TPH of concrete specification sands.

No. 78 Wemco Sand Preparation Machine. Note large overflow and quiet pool action for retention of +200 mesh fine sands.

1 ABILITY TO PRODUCE SPECIFICATION SANDS

Many Wemco units are preparing sands graded from a few percent +4 mesh down to a few percent −200 mesh. For example, Wemco machines not only meet the California State Specifications for Portland Cement Concrete (listed below)—but they do so at high rates of production on sands requiring thorough washing and elimination of up to 15% −200 mesh slime, clay and other colloidal deleterious materials.

CALIFORNIA STATE SPECIFICATIONS
Concrete Sands Used With Portland Cement

Sieve Size	% Passing	Sieve Size	% Passing
3/8"	100	50-m	10-20
4-m	90-100	100-m	2-8
8-m	65-90	200-m	0-4
16-m	45-70	270-m wash	0-3
30-m	25-45		

2 HIGH CAPACITIES

Wemco units, in meeting such specifications as above, retain their high productive capacity. For example, one No. 60 Wemco machine is producing 200 TPH of specification concrete sand with only 0.9-1.5% −200 mesh content in sands. The large weir overflow on Wemco units provides for a high rate of removal of slimes, clay, mud and other waste materials while valuable fine sands are retained in the settling tank. Spiral conveying units with high raking capacity assure clean, dry sands which can readily be transported on steeply sloping conveyor belts.

3 LOW MAINTENANCE COSTS

The sturdy construction and nearly automatic operation of Wemco machines result in less maintenance, horsepower, operator attendance and down time costs. For instance, one operator using two No. 78 Wemco units produced 1,790,000 tons of sand with replacement parts costs running only 4/100ths of a cent per ton of feed. Results like this prove Wemco Sand Preparation Machines cost less to operate, **yet produce specification sands at high rates of capacity.**

These are some of the reasons why so many progressive operators prefer Wemco units. Simply stated, it's because they can do a job other machines cannot do. Why not drop Wemco a line—no obligation, of course—and let us advise you on your sand production problems. And—request Wemco Sand Preparation Bulletin C-1-0-2

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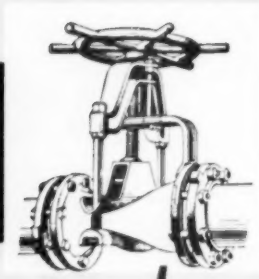

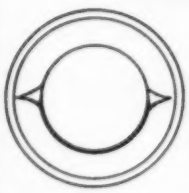

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little as 20 tons per shift would here mean loading one additional car per shift.

Stationary Plants

The La Grange plant is a stationary unit, producing washed sand and gravel. Pit material is hauled to the plant in a fleet of Euclid bottom-dump

Dragline at Jay Ray No. 2 plant which was converted from steam to diesel power

haulage units. Two draglines are in the pit; one for stripping and one for loading gravel. About 3 to 10 ft. of overburden is stripped to get 4 to 10 ft. of gravel. Most of the digging is above water line. An Austin-Western jaw crusher is the primary unit with a set of Pioneer double rolls for secondary crushing. The frame of these rolls has been split horizontally by the mechanical department of the company so that the shaft, star gears and shell can be lifted out as a unit and replaced by a spare set. This saved two to four hours per repair. The set-up is such that either crusher can operate without the other. The plant has a capacity of 150 t.p.h. and is on the tracks of the Missouri, Kansas & Texas Railroad.

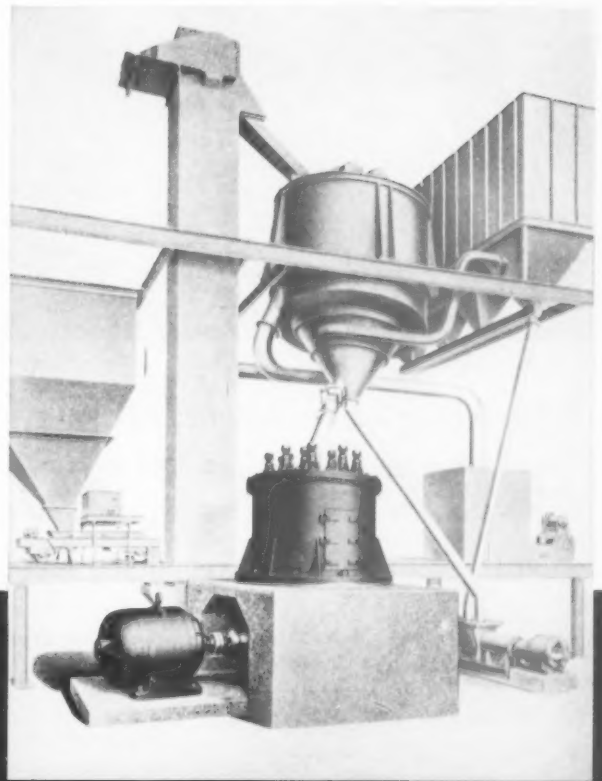
The Fayetteville operation (Tamberg Plant) is quite similar to the La Grange operation. However, the source of gravel is the so-called "hill-top" deposits. These are relatively thin and scattered dome deposits that are essentially skimmed off as the primary mining operation. The deposits range from 2 to 5 ft. thick. No stripping other than small trees and brush is necessary. A Bucyrus-Erie 37-B does the primary loading. An International tractor with a Bucyrus-Erie dozer removes brush, etc. from the deposits. The output from this plant goes mostly for black top work, road base and similar uses.

Official personnel includes Russell Thorstenberg and Frank Tamborello, partners; Joe Spear, traffic manager; R. L. McMillian, general superintendent; Lee Cassel, superintendent, Jay

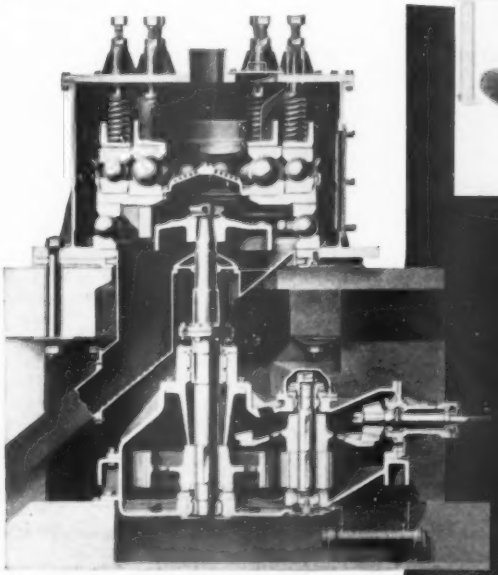
Here's How B&W's Closed-Circuit System

Reduces RAW GRINDING *Costs*

- *No separate drying equipment needed.* Automatic and simultaneous grinding and drying of raw materials is accomplished within the B&W System.
- *Lower fuel costs.* For example, if oil is used to heat drying-air, consumption may be as low as 0.3 gal per ton.
- *Lower power demand.* Ball-and-race principle of grinding used in the B&W Type B Mill operates with an extremely low friction loss, using less power while delivering maximum capacity of product.
- *Less maintenance.* Tough, alloy grinding elements of the B&W Type B Pulverizer are of specially selected steels and heat-treated for maximum wear-resistance, to assure uniform, self-equalizing wear throughout their long life.
- *Far higher capacity in equal space.* Powerful yet compact, the B&W Type B Pulverizer has a high unit output and can replace other types without additional structure.



Typical B&W Closed-Circuit Drying and Grinding System.



Cross-section of a B&W Type B Pulverizer. Heart of the B&W Closed-Circuit System, the Type B Mill is available in sizes suitable to all capacity requirements . . . employs three sets of grinding elements and a free gravity discharge.

It will pay you to get full details of all the cost-saving features of the B&W Closed-Circuit System as they relate to your raw grinding requirements. The Babcock & Wilcox Company, Boiler Div., Process Equipment Dept., 161 East 42nd Street, New York 17, N. Y.

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Ray No. 1-2 plants; Albert Cassel, assistant superintendent, Jay Ray No. 1-2 plants; Adolph Fiek, superintendent, Ramsey plant; Roland Woehst, superintendent, west side, Jay Ray No. 2 plant; Roy C. Lehmann, superintendent, La Grange plant.

Lime Convention

(Continued from page 79)

Conclusions as taken from the original report are as follows:

1. Mortar does not get into the voids of rough brick, regardless of whether the voids are large as in rugs or small as in sand-finish brick.
2. Capillary action of some brick surfaces draws moisture from the mortar before perfect bond can take place.
3. Loose or removable sand on any faces of brick raises capillarity and reduces bond considerably.
4. For rough brick a mortar is needed with a sufficiently high workability to fill the voids on the face of the brick and sufficient water retention to nullify the surface capillarity.
5. In head joints the poorer joint is the backup joint. In bed joints it is the contact with the brick above. The spreading of short bed joints is advocated.
6. Time in tooling is important. Tooling too quickly breaks the bond.
7. Wetting of mortar boards or the use of metal or treated wood boards is advocated to keep the water in the mortar as long as possible.
8. Some brick of low suction require wetting for proper bond and should be tested to determine the need.

Mr. Thornton's complete paper, as presented, has been reprinted from The Journal of the American Ceramic Society, Vol. 36, No. 4, April, 1953, and we assume that copies may be available. It is complete with data and charts which may be of great interest to producers of mortar materials and manufacturers of masonry units.

Labor Relations

The underlying reasons for prevalent labor troubles and suggestions for improved relations were presented in an excellent talk, "A New Era in Labor Relations," by James D. Moore, Specialized Services to Management, Chicago, Ill. Mr. Moore is labor counsellor for a number of industries and one of those gifted speakers with the faculty of getting across to his audience points that otherwise might never make an impression.

Labor stress has resulted, he said, because of mass production methods and lack of contact between management and labor that came with it. A generation ago, the owners of business knew their workers by first name, a premium was placed on individual skills, workers felt secure in those skills, took pride in their work and were given appropriate recognition for their craftsmanship. Workers took pride in their company, plants

From ancient hand methods . . .

to modern high speed operation

Statue of "The Grinder", represents a Scythian slave whetting a knife on an irregular shaped, natural sharpening stone.

ABRASIVES *have been the* "Silent Partners" *of World Progress*

Since ancient man's first need for tools and weapons, abrasives have been a decisive factor in shaping the progress of civilization. As man's manufacturing abilities increased, natural abrasives were no longer sufficient . . . which led to the use of the first manufactured grinding wheel. Today, practically every man-made product depends upon abrasives.

Of utmost importance in processing, prior to the manufacture of the finished abrasive product, is the method of reducing the hard component materials into workable sizes as quickly and efficiently as possible. *Here, as in all other fields where fast, low cost reduction is paramount for profitable production, SYMONS* Cone Crushers are widely used by the leading producers of abrasive products . . . to produce a constant, uniform size of material.*

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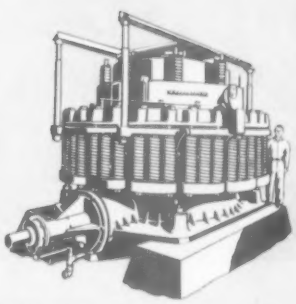

SYMONS* Cone Crushers . . . the machines that revolutionized crushing practice . . . are built in Standard, Short Head, and Intermediate types, with crushing heads from 22 inches to 7 feet in diameter — in capacities from 6 to 900 tons per hour.

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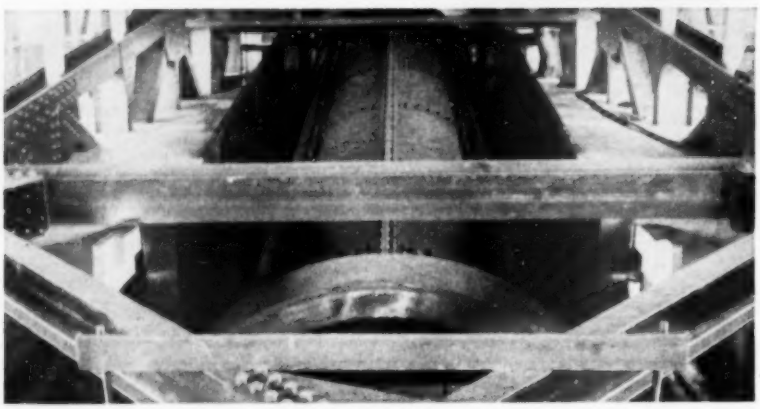

ABOVE

YUBA-built revolving screen, 50′ long, 9′ diameter, weight about 65 tons.

AT LEFT

YUBA-built conveyor stacker for conveying rock tailings from revolving screen on YUBA placer dredge to rock piles astern. 44″ belt, 225′ long.

You get long wear, reduce shutdowns for replacement when separating, scrubbing or sizing with YUBA Screens. They're made from Abrasion Resisting Steel* plate, a high carbon, high manganese alloy steel with Brinnell hardness of 200 to 250. Taper drilled holes prevent clogging, can be small and closely spaced for screening monazite sands and other rare earths. Flat or revolving. All thicknesses from ¼" up; other dimensions as needed. Screens with cast manganese steel plates also can be furnished on request.

* United States Steel product

Conveying rock, sand and gravel has been part of YUBA's business ever since 1909. We've built hundreds of heavy-duty conveyors for use on dredges, in pits and at plants. Bring your conveyor problems to us for recommendations and estimates. No obligation. Wire, write or call TODAY.

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were active in their communities and towns took pride in their plants. Workers enjoyed a sense of belonging.

By contrast, said Mr. Moore, things have changed and about 80 percent of workers today are unhappy and frustrated. The trouble stems from the fact that a sense of belonging, with security and happiness, has been exchanged for a number, a badge and a big pay check. Units of production which a worker puts out are the only criterion of a worker today. As plants developed mass production techniques, more eschelons came between labor and top management and worker skills were no longer needed.

It was these events that led to labor leaders like John L. Lewis who recognized the need of the worker for security and recognition. We are now at a cross-road and the main danger today, in Mr. Moore's opinion, is that if too rigid anti-labor legislation be enacted we might conceivably end up with a labor party. With all the bills being proposed to limit union activities, labor must lean heavily on the president and Senator Taft, in his opinion, or face serious curtailment.

Management cannot deal successfully with unions by kicking them, cannot legislate a man's mind or buy a worker's loyalty and initiative, he said. Management has got to earn a man's loyalty and must come up with better ideas than those of the unions. He reminded that it is the highest paid workers who strike the most often.

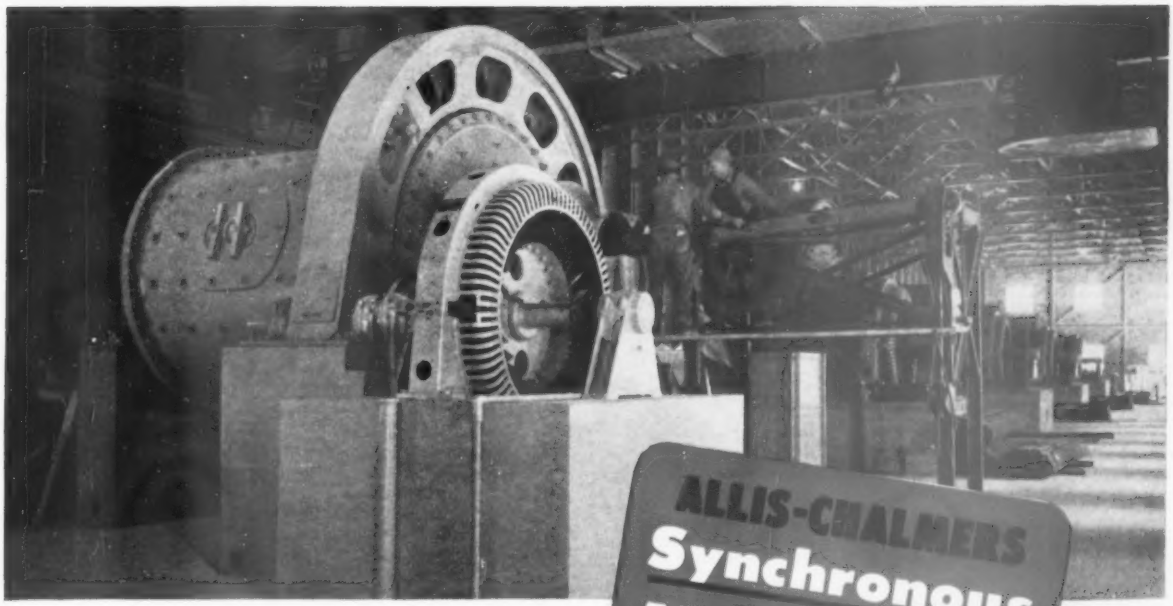
Among some of labor's newer goals in addition to top wages, union shops, pensions, contracts, longer paid vacations, fringe benefits, automatic increases, etc., are more and more fringe benefits, "galloping" seniority provisions that permit totalling work done for all employers, more holidays which would include birthdays, three days for family funerals, time out for union conventions, change and rest time, floors in escalator clauses and many other demands. Guaranteed wages are going to be heard from more as well, which would require stabilized sales and production.

It is up to management to come up with something to supplant all this, which will require a new concept in how to handle men and run a business. This, said Mr. Moore, will require the adoption of new techniques in human relations. Foremen will have to be trained to understand the attitudes of men, companies must become re-identified with community service, the dignity of the worker must be respected and steps taken to make him happy so that he will recognize the importance of his company's success.

"American Horizon"

Professor Walter C. Voss, Massachusetts Institute of Technology, Cambridge, Mass., presented a thought-provoking address which was entitled "The Dangerous American Horizon."

This presentation was quite in con-



Midwestern installation of five Allis-Chalmers 9 x 12 rod mills and 450-hp, 100% pf, 440-volt, 257-rpm, pedestal bearing synchronous motors.

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Here are three reasons why Allis-Chalmers grinding mill motors help keep your mills grinding economically year after year:

Each motor is engineered for its job. A-C's half century of experience building electrical equipment *and* processing machinery assures torque and other operating characteristics tailored to the individual installation requirements.

Time-proved basic design features contribute to long life and trouble-free operation. These are described in Bulletin 05B7648.

Adequate manufacturing, inspection and testing facilities insure that each motor will be built exactly as specified.

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The gravel operation at right is one of three modern plants at different sites, producing about 500,000 tons of concrete aggregate annually for a large Ohio firm. These plants depend solely on Sauerman Rapid-Shifting Scraper Machines to dig and move their material. The machine in the picture uses a 3-cu. yd. Sauerman Crescent bucket operating on a 550-ft. span. It has dug a sizable pit down to the water level and will extend the pit in two directions, besides continuing under water to the full depth of the deposit.

SAUERMAN EARTHMOVERS

Labor saving efficiency . . . low initial cost . . . rugged digging and hauling power . . . all-around versatility . . . and moderate power requirement . . . are distinct advantages that have made Sauerman Earthmoving Machines famous for over forty years. Sauerman Machines spot and dump automatically under the easy control of an operator situated in a comfortable cab overlooking the work area.

Drag Scraper Excavator: Combines digging power, hauling speed and long reach for efficient pit or hill excavation, reclamation and handling of materials, wet or dry.

Slackline Cableway Excavator: Unequalled for operations that require deep digging, especially under water, and delivery to a high point. Reaches hundreds of feet into ponds, wet pits, sludge basins and similar areas, while operator remains in a safe spot.

Mobile Tower Excavator: Self-propelled drag scraper machine, affording great digging capacity, long reach and exceptional mobility. Ideally suited to stripping operations, pit excavation, re-handling mine waste and for stockpiling.

Scrapers on Boom Machines: Sauerman Crescent Scraper buckets are invaluable as auxiliary digging equipment for boom machines. Use of a Crescent bottomless bucket in place of a conventional dragline bucket increases the capacity of a boom machine on work where material has to be moved but not lifted. Any given size and type of boom machine will handle a Crescent of much larger capacity than its ordinary bucket. This combination of boom machine and Crescent bucket is widely used for scraping gravel to a hopper, backfilling, and cut-and-fill jobs.

Sauerman also builds scraper-stockpilers, scraper-loaders, power rakes and related equipment. For full information send for illustrated, descriptive literature. Consult our engineers for assistance in your earthmoving or bulk materials-handling problems.

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trast with others he has given over the years, not being concerned with technology but with his observations of what is wrong with our American economic and social system today. Prof. Voss was to be retired from M.I.T. on July 1 and this talk was sort of a "swan song" speech as he termed it.

He was very critical of the social experiments of the past 20 years, and concerned for the future of America as a result of the attitudes that prevail today. Public indifference and reckless government like we have had so long has killed nations in the past, he said, citing the Roman empire as an example paralleling conditions as they exist today. Prosperity ripened the Roman empire for the decay that ended it and we have the same predisposing factors existing in this country today.

As a second part of his talk Dr. Voss gave a progress report on the fundamental research at M.I.T. under J. Murray who was unable to be present. A few years ago the research started with the calcination of pure calcite. This past year, 45 high calcium limestones were burned as part of the endeavor to find out how the trace elements in natural stones affect calcination and the properties of the limes produced.

Slides were shown to point out the physical differences in stones—such as crystallinity—which affect production. Spectographic studies of the trace elements have been run and many of them identified. These elements, he said, are hidden in the crystalline lattice and markedly affect burning and hydration.

Research is being done at various calcination temperatures, over-burning effects are being studied, etc. The objective is to arrive at knowledge of the effects of all the heterogenous elements in limestone as fundamental to control of plant operations and quality of product.

Washington Picture

Honorable S. Walter Stauffer, member of Congress and past president of the National Lime Association, gave an unofficial report on his observations on "Congress and the New Regime in Washington." Mr. Stauffer's talk was excellent and gave a good summary of problems being faced in Washington that have slowed the changes which all who supported the new administration are anxiously awaiting.

He assured his audience that the promised changes are well under way, that a big exodus of New Deal democrats is underway, that sincere men of high stature are in Washington to protect the public interest and that the budget will be balanced. The complexities which were found in Washington and commitments carried over from the previous administration are among the things that have retarded progress in making the expected changes.

- **All maintenance points are easy to reach.**
- **Can be taken down and returned to service in less than a half hour.**
- **Many parts interchangeable between different pump sizes.**

Here's a pump that maintenance men like. The Allis-Chalmers solids handling pump is solidly built to stand rough solids handling service. And it's easy to work on. Notice how accessible the packing gland is. See how the casing bolts are arranged. Just loosen the nuts a couple of turns and the bolts lift out.

Wearing parts separate into easily handled units. In fact, one man can tear down an Allis Chalmers solids handling pump, replace a part and have it back in action again *in less than a half hour*. Piping need not be disturbed unless the casing is replaced.

COMPLETE PUMPING UNIT FURNISHED

This pump is equipped with *Texrope* V-belt drive and *Vari-Pitch* sheaves. Head and capacity can be varied instantly by the turn of a crank. Allis-Chalmers can furnish the complete pumping unit — pump, motor, control and drive — assembled and ready to run.

GET THE COMPLETE STORY

Every Allis-Chalmers solids handling pump is application-engineered by a specialist who knows solids handling equipment problems and how to solve them. Your nearby Allis-Chalmers representative will be glad to give you complete facts and figures on CW pump performance. Or write Allis-Chalmers, Milwaukee, 1, Wisconsin and ask for Bulletin 52B6381. A-3975

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NOW

...even longer wear

Impeller and suction wear plate now made of *Ni-Hard* alloy at no extra cost. You get longer wear . . . lower pumping costs.

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HIGH SPEED PRODUCTION is routine with a Nelson! Sand, gravel, broken stone (up to 3" cube), lime, gypsum, etc., can be loaded at up to 4 cu. yds. per min. Users report day after day production of over 1,000 tons per 8 hour day . . . Hydraulic boom control is instantly responsive and is automatically held at any desired position. Boom can be lowered without disconnecting drive chains. Rotary Screen attachment available.

STEEL TOOTHED SPIRALS "pick before they shovel" to loosen material for faster loading . . . Mounted on 6 rubber tires, the P-11 is highly mobile and easily operated by one man . . . You can depend on a NELSON for high-speed loading at the lowest possible cost!

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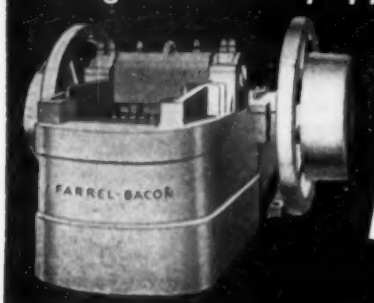
designed and equipped by **FARREL-BACON**



Farrel-Bacon provides a complete engineering service, including design of plant and supplying all equipment from primary crusher to bin gate. Jaw-type crushers are available in sizes from 60" x 48" to 10" x 7" *Write for complete information.*

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BA 5

Agstone Directors Emphasize Promotion

More than two-thirds of the membership of the board of directors were present at the board meeting of National Agricultural Limestone Institute, held June 12, at Chicago, Ill. The directors considered significant developments since the last meeting and heard reports from the president, the treasurer, executive secretary and all the standing committees. Also covered was an expanded program of activities for the future.

President K. K. Kinsey summarized principal developments and expressed the opinion that the association has made good progress along many directions. A number of committees are now functioning, one of them being a new market development committee, set-up as a means of exchange of ideas, geographically, pointed to developing outlets for excess sizes of limestone. He stressed the need for enlarging the membership.

Executive secretary Robert M. Koch reviewed the activities of his office in connection with the 1954 ACP program and how matters stood in Washington. At the time of the meeting, Mr. Koch said that ACP Memorandum 5 as proposed by secretary of agriculture Benson would leave very little funds for assistance to the farmer in purchasing agstone but he predicted that the final result might be $20 million for fiscal 1954 or about half the amount for 1953. The board passed its approval to a change in the by-laws permitting establishment of a manufacturers' division. Associate members will hold a meeting for the establishment of a permanent organization.

The report of the legislative committee stressed the need for more funds for a broad program of education, and enlisting the support of other organizations to put over the importance of agstone in agriculture and public health.

On the subject of percentage depletion, the committee reported that the end use interpretation will likely be applied in the regulation to be written. The committee believes it has a strong case for 15 percent percentage depletion. The promotion committee reported its fulfillment of the recommendations made at the last annual convention, in the preparation of circulars and stuffers for distribution to the farmer and the consumer. The use of the posters available through the Iowa Agricultural Limestone Association was strongly recommended as was the use of newspaper advertising. Radio and television advertising programs may be worked up in the near future, and work with the Green Pastures program is continuing. It was recommended that the industry back up the U.S.D.A. program, that a slogan be adopted and that producers put on educational programs through their colleges.

(Continued on page 120)

MANUFACTURERS NEWS

Link-Belt Co., Chicago, Ill., has announced the appointment of Harvey V. Eastling as assistant general manager of the Pacific division, with headquarters at San Francisco, Calif. He was formerly general sales manager of the division. Donald E. Thal, formerly assistant sales manager, has been appointed sales manager of the San Francisco plant.

Nordberg Mfg. Co., Milwaukee, Wis., has appointed Southern Engine & Pump Co., Houston, Texas, as sales and service distributor in 117 Texas counties and southern Louisiana, through its branches at Dallas, Edinburg, Kilgore and San Antonio, Texas, and Houma, La.; also through offices at Lafayette and New Orleans, La.

Atlas Powder Co., Wilmington, Del., has announced the election of Ralph K. Gottshall as president of the company and chairman of the executive committee. He succeeds Isaac Fogg, who has been made chairman of the board and continues as chairman of the finance committee. Mr. Fogg succeeds Leland Lyon who remains as a member of the board. Mr. Gottshall has served as executive vice-president since May, 1952. He has been a director and member of the executive committee since 1951. Prior to that he was assistant general manager of the explosives department, having been promoted to that position from director of explosives sales.

Ralph K. Gottshall

Bucyrus-Erie Co., South Milwaukee, Wis., and International Harvester Co., Chicago, Ill., have announced an arrangement whereby Bucyrus-Erie industrial tractor equipment will be sold, distributed and serviced by Harvester to its industrial power distributors and eventually will be manufactured by Harvester.

Frank G. Hough, Libertyville, Ill., announces the appointment of Kenneth B. Larkin as district representative in Washington, Oregon, Idaho, Montana and the Canadian Provinces of British Columbia, Alberta and Saskatchewan. He succeeds H. E. Thomas who has been made district representative in Illinois, Michigan, Indiana, Ohio, Kentucky and eastern Missouri.

Clark Equipment Co., Battle Creek, Mich., has appointed Christy Equipment Co., Omaha, Neb., as distributor in the Iowa counties lying west of Dickinson, Clay, Buena Vista, Sac, Carroll, Guthrie, Adair, Union and Ringgold counties; Nebraska counties east of the westerly lines of Cherry, Grant, Arthur, Keith, Perkins, Chase and Dundee counties; Minnesota coun-

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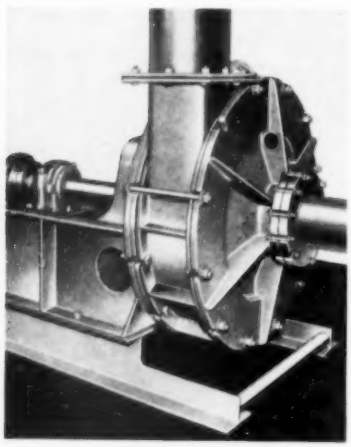
VACSEAL *Pumps*

without sealing water



In operation, the VACSEAL Pump is virtually glandless—since entrained solids (such as sand and gravel) cannot be forced into its gland. Leakage troubles are thus eliminated . . . with a consequent saving of maintenance and expensive shaft renewals. For non-stop handling of abrasive pulps and slurries, Vacseal is the answer. Easy replacement of parts is another feature that maintenance men appreciate.

Our VACSEAL PUMPS are the American version of the famous English Vacseal Pump, long a favorite in the rock products industries of Europe and Africa. It has performed successfully in the most rigorous and exhaustive tests our engineers could devise. Write for all the details.

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ties of Rock, Nobles, Jackson, Pipestone, Murray, Cottonwood, Lincoln and Lyon; and the entire state of South Dakota. The Omaha distributor replaces the Sioux Falls, S. D., distributor.

Chase Bag Co., Chicago, Ill., has announced the appointment of Paul Clancey as representative in eastern Washington, northern Idaho, and western Montana, with headquarters in Spokane, Wash. H. R. Capers, Jr., has joined the company as junior salesman in the Dallas-Ft. Worth, Texas, metropolitan area.

International Harvester Co., Chicago, Ill., announces that Harold T. Reishus has been elected vice-president in charge of the industrial power division. He has been general manager of the division since its formation in 1944.

Pioneer Rubber Mills, San Francisco, Calif., announces that J. R. Keach has joined the company as assistant to the executive vice-president. He was formerly vice-president and general manager of the Quaker Rubber Co.

Bucyrus-Erie Co., South Milwaukee, Wis., has appointed Euclid-Arkansas, Inc., North Little Rock, Ark., as distributor for the state of Arkansas except the counties of Craighead, Mississippi, Poinsett, Cross, Crittenden, St. Francis, Lee and Phillips.

Thermoid Co., Trenton, N. J., has announced the election of Carl P. Brockway as president and director of Asbestos Mfg. Co., Huntington, Ind., a subsidiary. He is a vice-president of the parent company. Mr. Brockway was formerly superintendent of the friction division and will be succeeded in this position by A. K. Runkle.

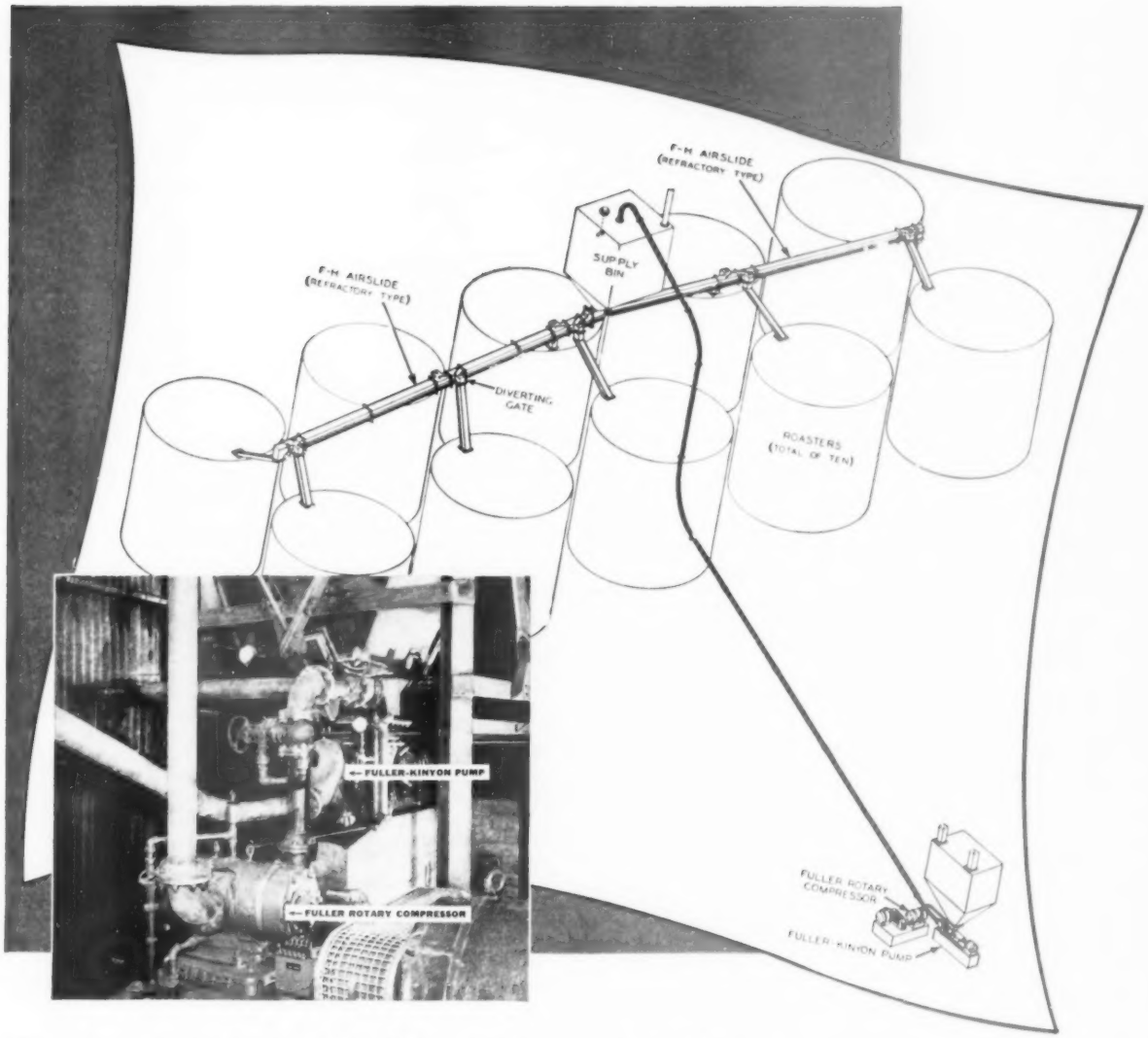
Caterpillar Tractor Co., Peoria, Ill., has announced plans for construction of a new plant for production of motor graders and industrial wheel tractors. Location of the plant, which is expected to be completed by the end of 1955, has not yet been determined.

Barber-Greene Co., Aurora, Ill., has announced a new sales assistance group called the Field Engineer Section, which will provide on-the-spot factory and engineering assistance to distributors and customers and will supplement the activities of the eight domestic area sales managers.

Marion Power Shovel Co., Marion, Ohio, has announced the appointment of Tractors, Inc., Providence, R. I., as distributor for the entire state of Rhode Island and southeastern Massachusetts.

Sintering Machinery Corp., Netcong, N. J., has announced the following sales representatives: Tate & Roe Co., Dallas, Texas, for Texas, Oklahoma and northwest Louisiana; Supply Division, Lake Shore Engineering Co., Iron Mountain, Mich., for iron range portions of Minnesota and Wis-

(Continued on page 113)



Conveying "Hot Stuff" at Noranda Mines--- with Fuller-Kinyon Pump and F-H Airslides

Problem: To convey hot flue dust from Cottrell precipitator collecting hoppers, and distribute uniformly to ten roasters, without dust or loss.

Solution: After long and careful study by both Noranda and Fuller engineers, it was decided to install a Fuller-Kinyon Conveying System as the most practical and efficient method of conveying from the precipitator to a supply bin. A Fuller-Kinyon Pump, with water-cooled seal, handles this flue dust at temperatures up to 800 deg. fahr., at rate of 25 tons an hour, in a highly satisfactory manner, through a conveying line of approximately 220 feet. From the supply bin, F-H Airslides, of the refractory type, convey and distribute the material to the roasters, with no dust or loss.

A Fuller Rotary Single-stage Compressor furnishes approximately 478 c.f.m. of air at 15-lb. pressure, to the Fuller-Kinyon Pump, through a direct-connected air line.

When your problem is conveying dry, pulverized materials, why not have a Fuller engineer make a study of your requirements. His findings may result in savings you never anticipated or thought possible. Write us today!

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G-81
1967

DRY MATERIAL CONVEYING SYSTEMS AND COOLERS—COMPRESSORS AND VACUUM PUMPS—FEEDERS AND ASSOCIATED EQUIPMENT

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C-13

consin, and Michigan's northern peninsula; and The Galigher Co., Salt Lake City, Utah, for the state of Utah, neighboring areas in Nevada, Idaho, Montana and Wyoming.

John J. Yellen, Perth Amboy, N.J., has appointed the Mortarless Machine Corp., Los Angeles, Calif., as distributor for the Yellen H-Speed block machine on the West Coast, Hawaii and the Southwest. The Colby Construction Co., Vineyard Haven, Mass., has been named distributor for New England and the Maritime Provinces of Canada. For the past four years the Mishco Corp., Miami, Fla., has been distributor in this country as well as in Cuba, Central and South America, the Philippines, New Zealand and Australia. The machine is manufactured by the Miami Shipbuilding Corp., Miami, Fla., which also handles the repair and replacement parts business.

American Brake Shoe Co., New York, N.Y., has announced the appointment of Gilfry Ward as president and Joseph L. Mullin as first vice-president of the American manganese steel division. Mr. Ward joined the division as a trainee in the engineering department in 1928. He has been vice-president in charge of sales since 1948. Mr. Mullin, who joined the company in 1914, was formerly vice-president in charge of operations of the division.

The Babcock & Wilcox Co., New York, N.Y., has announced the appointment of J. E. Brinckerhoff as general manager of the refractories division. He was formerly sales manager of the division. Other appointments include: C. L. Norton, Jr., executive assistant in charge of all development and engineering activities; Carl Claus, executive assistant in charge of all sales and manufacturing operations; J. D. McCullough continues as chief engineer; Mark J. Terman, sales manager; Bradford Hooper, technical director; and Royce K. Mack, superintendent of the Augusta works.

Highway Equipment Co., Inc., Cedar Rapids, Iowa, has announced the appointment of William W. Kingman as general sales and advertising manager. He was formerly Chicago branch manager for Illinois Contractors' Machinery, Inc. Prior to that he was sales manager for the manufacturing division of Maxon Construction Co.

Williams Patent Crusher & Pulverizer Co., St. Louis, Mo., has announced the appointment of Woodrow W. West, New York, N.Y., as sales representative for eastern New York, Connecticut and northern New Jersey.

Clark Equipment Co., Industrial Truck Div., Battle Creek, Mich., announces that Al G. Morrison, formerly manager of the central west region, has been named a dealer for the western half of Michigan. Stephen C. Lobdell, who was his assistant regional

(Continued on page 118)

Tuffy®
SCRAPER ROPE Handles Extra Yardage

"Can't Understand Why Anyone Would Use Another Brand"

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One Le Roi Airmaster 600 cfm Compressor provides all the low-cost air you need to operate the T286 Dual Drill Rig, when it is equipped with Le Roi-CLEVELAND 4" drifters. A smaller compressor is sufficient, when the T286 is equipped with the 45-lb. H10 or 80-lb. H23 ($3\frac{1}{8}$"-bore) sinker drills or $3\frac{1}{2}$"-bore D25 drifter.

WITH a Le Roi-CLEVELAND T286, your man *drives* where he wants to go — over almost any kind of ground — and tows the compressor right along.

He drills and cleans holes as deep as 30' — in any direction — at any angle — with less air.

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C-142

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INFORMATION

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You can obtain catalogs listed on these pages by merely checking and mailing the coupon below

1 AIR COOLING UNITS—The Fluor Corp. has released a 12-pg., illustrated bulletin, No. FF-FD-0.001, on air-cooled heat exchangers for industrial cooling and condensing applications. Typical applications are described while maintenance, design and features are also discussed.

2 ARC WELDING—Hobart Brothers Co. points out the uses of arc welding in various industries in its 40-pg. booklet, No. EW173. Its line of arc welders, electrodes and accessories are illustrated along with descriptions of its welder features. Typical applications are also given.

3 BULLDOZERS—The Baker Manufacturing Co. describes the 15X heavy-duty bulldozer in a four-page bulletin. The folder illustrates the operation and design of the tractor-dozer and explains its various features.

4 BURNER CONTROLS—Combustion Control Corp. has published Bulletins CP519 and CP520 on its manual, semi-automatic and fully automatic Fireye Flame controls for gas-oil or coal systems.

5 CAR SPOTTERS AND PULLERS—Link-Belt Co. has released Book 2092, describing the use of electric car spotters and drum-type car pullers. Specification tables, engineering data, typical car puller and spotter layouts, and installation photographs are included.

6 CASTINGS—American Brake Shoe Co. has issued a 12-page booklet on industrial castings of "Ductalloy," ductile iron. Properties, characteristics and applications are given along with illustrations of typical castings for use in chemical, diesel, and general industrial fields.

7 CENTRIFUGAL FANS — Westinghouse Electric Corp. discusses standard and heavy-duty centrifugal fans for industrial heaters in Catalog 1510. Sections covering construction, installation, application and accessories are included. Performance tables and graphs and an explanation of automatic temperature control are also given.

8 CLUTCHES AND DRIVES—Twin Disc Clutch Co. has released a 16-page "New Products" issue of "Production Road." Five friction and hydraulic drives are described and illustrated, as well as various type clutches.

9 CONTROLLERS — Minneapolis-Honeywell Regulator Co., Brown Instruments Div., offers a 56-page catalog No. 1530, on various types of "ElectroniK" control instruments used to measure and control various process variables. Specifications and ratings for electric and pneumatic type controllers are discussed along with design and construction features.

10 CONVEYOR BELT CARRIERS—Stephens-Adamson Manufacturing Co. has released Bulletin 453 describing and illustrating the 220 Series "Simplex" conveyor belt carriers. Assembly drawings and specification charts are given.

11 CONVEYOR BELTS — Boston Woven Hose & Rubber Co. has released an eight-page rotogravure brochure on its conveyor belts, V-belts, hose and tape. The text is done completely in illustrations with captions.

12 CRANE — American Steel Dredge Co., Inc., Wayne Crane Div., has published an 8-page catalog entitled "Meet the Heavyweights." Descriptions and illustrations of crane Model 20 are given along with specifications, operating data and lifting capacities.

13 CRUSHERS—Gruendler Crusher & Pulverizer Co. has published Bulletin BR 35-10 describing its gravel crushing and screening plants. Plant drawings, equipment part photographs and specification charts are given.

14 DIATOMITE—Johns-Manville has published a 28-pg. brochure entitled "Celite—The Story of Diatomite" which employs photographs and drawings to trace the development of diatomite. It explains what a diatom is; how they emerged into a deposit; the discovery and experiments leading to its use today; current benefits as filter powder for water purification, fertilizers, insulator, etc.; and a brief prediction of its future.

15 DIESEL MAINTENANCE — Caterpillar Tractor Co. has brought out Form 30562, a cartoon-type instruction booklet illustrating the maintenance of its four large type diesel electric sets.

16 DIESEL TRACTORS—The R. H. Sheppard Co. has released a bulletin on its line of diesel industrial tractors equipped with the Baker-Lull Shoveloader. Specification charts and views of the tractors and front-end loaders are given.

17 DUMP BODIES—Gar Wood Industries, Inc. has published Bulletin HB302 featuring its line of dump truck hoists and bodies. Illustrations, specifications and descriptions are included.

18 ELECTRODES—Air Reduction Sales Co. has issued a "Pocket Guide to Electrodes," giving complete details on its line of electrodes.

19 ENGINEERING REPORT—Government Printing Office, Washington 25, D.C., has available "Annual Report 1952, National Bureau of Standards," the Bureau's miscellaneous publication No. 207. Summaries of scientific and engineering investigations conducted by NBS during 1952 are given along with accounts of current activities and descriptions of representative projects. The 81-pg. publication may be obtained at a cost of 30 cents from the Government Printing Office.

20 EXCAVATORS — Pippin Construction Equipment, Inc. has issued two folders describing and illustrating its excavators for use with Ford and Ferguson tractors. Specifications, drawings and photographs are included.

21 FAN DRIVE — Schwitzer-Cummins Co. has issued Form 558, describing and illustrating the Thermatic fan drive for application on heavy-duty engines.

22 FLUID DISPENSER—Oil-Rite Corp. has released Bulletin 82-11, describing and illustrating an air pressure-operated, oil and fluid dispenser. A drawing is given of the dispenser along with specifications.

23 FORK LIFT TRUCKS—Towmotor Corp. has issued a booklet entitled, "How to Use Handcuffs Where They'll do the Most Good," discussing methods of eliminating costly losses through the use of its fork lift trucks. Typical operations are shown and described.

24 GEAR MOTORS—General Electric Co. announced publication of a 16-page Bulletin GEA-1437H, describing the function, design and application of "Tri-Clad" gear motors. Cut-away photographs, application table and maintenance data are included.

25 GYPSUM LATHS AND SHEATHING—Gypsum Association has prepared two illustrated pamphlets describing uses, physical properties and methods of installation of gypsum laths and sheathing. Also included are detailed architectural specifications.

26 INDUSTRIAL TIRES—B. F. Goodrich Co. has published an eight-page booklet explaining industrial tire maintenance and recapping. Inflation rules, load distribution and a mileage cost chart are included.

27 HYDRAULIC MOTORS — Vickers, Inc. has brought out Catalog M-5101 on its hydraulic pumps, controls, power packs, unit valves, power steering and motors. Specifications and engineering information are also listed.

28 JAW CRUSHERS—Gruendler Crusher & Pulverizer Co. has released Bulletin BM-10 giving descriptions, specifications and photographs of the Series "10" jaw crushers, primarily used for gravel and secondary crushing. Typical applications are also illustrated.

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29 LIFT TRUCK—Towmotor Corp. has released an optional features sheet describing the method of operation and construction of its "No Spin" differential, which is used with its lift truck model LT-60. Illustrations of the differential and fork lift truck are given.

30 LOADER—Baker-Lull Manufacturing Co. has released literature describing the construction and industrial uses of the Shoveloader. Applications and attachments are illustrated. Also included are specification lists and descriptions of performance characteristics.

31 MATERIALS HANDLING EQUIPMENT —Kornylak Engineering Corp. has announced its materials handling equipment reference chart. The 50 illustrations are classified into categories of bulk handling, storage equipment, power and hand trucks, truck accessories, cranes and hoists, chain and cable conveyors, etc.

32 MOISTURE TESTER — Engineering Products Co. has released a booklet on the "Speedy" moisture tester for determining the water content of raw, finished or processing materials. Application data and case histories are included.

33 MULTI-STAGE PUMPS — Food Machinery and Chemical Corp., Peerless Pump Div., is distributing Bulletin B-1400, describing its line of multi-stage pumps for supplying, circulating and boosting water and process liquids. Pump cross sections, parts lists, dimensional data, design details and application photographs are given.

34 POWER UNITS—General Electric Co. has published an illustrated bulletin, GEA-5928, describing the advantages, applications and construction of three-phase Inductrol power jacks. An outline diagram, specification and rating tables and voltage regulation data are also given.

35 PROTECTING SLEEVES—A & A Manufacturing Co. announces the availability of Bulletin BA-1, showing various applications of the Gortite sleeve for protecting booms on rock drills; worm drives on welding positioners; lead screws on stone cutters, etc. Methods for attaching the sleeves are shown.

36 PUMPS — Allis-Chalmers Manufacturing Co. describes its single-stage, double-suction, centrifugal pumps in Bulletin 08B6146B. It explains how to figure priming head, gives specification tables and tabulates friction loss. Operation photographs and drawings, explaining construction features, are included.

37 RADIATION DETECTORS — Minneapolis-Honeywell Regulator Co., Industrial Div., has issued a four-page specification sheet, No. 84, describing and illustrating "Radiamatic" radiation detectors. Construction and engineering details are covered.

38 RECORDERS — Minneapolis-Honeywell Regulator Co., Brown Instruments Div., has released three four-page specification sheets describing and illustrating Electronik recording potentiometers. Sheet 160 covers circular chart recorders, 164 and 165 cover single and multiple-record, strip-chart recorders.

39 ROLLER BEARINGS — The Torrington Co., Bantam Bearing Div., has published Bulletin 200-C, revised from 200-B, discussing its self-aligning spherical roller bearings. Specification and lubricant recommendation tables are included. Thread, lock nut and lock washer data is also given.

40 ROLLER CHAINS—Chain Belt Co., Baldwin-Duckworth Div., has prepared Bulletin 52-2 describing and illustrating the features of its riveted roller chain and single pin coupler link. Assembly diagrams and charts for all size chains are presented along with price lists, strengths, dimensions, weights, and boxed assembly specifications.

41 SAFETY POSTERS—The Baker-Raulang Co., Baker Industrial Truck Div., has made up a series of eight safety posters, designed to remind industrial truck operators of safe driving and operating practices. Printed in color on 14- x 22-in. sheets, the posters are done in a bold cartoon style, and are ready for mounting on company bulletin boards. "Be Smart—Be Safe" appears on each poster along with a typical heading for each subject. The complete set may be obtained from the Baker-Raulang Co. All requests must be made on company letterheads.

42 SAND PUMPS—Denver Equipment Co. has published a 20-page bulletin, P9-B8, describing and illustrating the SRL rubber-lined sand pumps. Lists and sectional views of pump parts, clearance and foundation dimensions, water friction, pump capacities, motor selection table and installation and maintenance instructions are given. Case histories and photographs of typical applications are also included.

43 SCRAPER—Euclid Road Machinery Co. presents details and features of the "lever action" 15.5-cu. yd. scraper in a 16-page catalog folder. Also included are the features of its 275 hp., four-wheel tractor.

44 SHIPPING BAGS—Kraft Bag Corp. has released a brochure on "Kraft-lok," a valve-type gussetted bag for packaging free-flowing granular or pulverized materials. Typical application illustrations are also shown.

45 SPEED DRIVES—Reeves Pulley Co. describes and illustrates the Flexi-Speed Drive in Bulletin V-532. Rating tables, shaft center distances and complete dimensions are listed.

46 STORAGE SYSTEMS — The Marietta Concrete Corp. has prepared a 12-page catalog discussing modern industrial storage systems. Construction details, a capacity chart and typical application photographs are included.

47 TEMPERATURE CONTROLS — Minneapolis-Honeywell Regulator Co., Brown Instruments Div., has released a four-page specification sheet, No. 116, describing and illustrating Pyr-O-Vane, Pulse Pyr-O-Vane and Protect-O-Vane automatic controllers for temperature regulation. Construction and engineering details are given.

48 VALVE PUMPS—The Farval Corp. has prepared Bulletin 39 describing the DC-20 pumping unit, intended for use with Farval Dualine valves. Its use for automatic centralized lubrication is described and drawings show details of its operation. A specification table is also included.

49 V-BELTS — Raybestos-Manhattan, Inc., Manhattan Rubber Div., has announced a fractional horsepower V-belt catalog. Belt and various type machine lists are included to aid in determining proper belt applications.

50 VIBRATING SCREENS—Universal Vibrating Screen Co. has available Bulletins 125, 65 and 140, describing and illustrating various type vibrating screens, including electrically-heated and high-speed screens. Specifications, installation and operating data are also given.

51 WIRE ROPE—Macwhyte Co. has released Booklet 5312, presenting a picture-story tour of wire rope manufacture.

52 WIRES & CABLES—United States Rubber Co. has published a 76-page booklet entitled "U.S. Electrical Wires and Cables for the Chemical and Petroleum Industries." The booklet is divided into four main sections: Insulation compounds; jacket compounds; construction; and technical data.

53 WORM GEARS AND SPEED REDUCERS — Michigan Tool Co., Cone-Drive Gears Div., has available a 4-page brochure, M-53, giving typical applications of double-enveloping worm gear sets and speed reducers in conveyors, rock drilling machines, etc., used in rock quarries and mines. Illustrations are also given.

54 X-RAY DEFRACTION—North American Philips Co., Inc., Research and Control Instruments Div., has available an eight-page booklet entitled, "Twenty Questions and Answers on X-ray Analysis." Specimen preparation, application, and advantages are covered.

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INFORMATION

TO HELP YOU MEET TODAY'S PROBLEMS AND TO MAKE PLANS FOR TOMORROW

You can obtain catalogs listed on these pages by merely checking and mailing the coupon below

1 AIR COOLING UNITS—The Fluor Corp. has released a 12-pg., illustrated bulletin, No. FF-FD-0.001, on air-cooled heat exchangers for industrial cooling and condensing applications. Typical applications are described while maintenance, design and features are also discussed.

2 ARC WELDING—Hobart Brothers Co. points out the uses of arc welding in various industries in its 40-pg. booklet, No. EW173. Its line of arc welders, electrodes and accessories are illustrated along with descriptions of its welder features. Typical applications are also given.

3 BULLDOZERS—The Baker Manufacturing Co. describes the 15X heavy-duty bulldozer in a four-page bulletin. The folder illustrates the operation and design of the tractor-dozer and explains its various features.

4 BURNER CONTROLS—Combustion Control Corp. has published Bulletins CP519 and CP520 on its manual, semi-automatic and fully automatic Fireye Flame controls for gas-oil or coal systems.

5 CAR SPOTTERS AND PULLERS—Link-Belt Co. has released Book 2092, describing the use of electric car spotters and drum-type car pullers. Specification tables, engineering data, typical car puller and spotter layouts, and installation photographs are included.

6 CASTINGS—American Brake Shoe Co. has issued a 12-page booklet on industrial castings of "Ductalloy," ductile iron. Properties, characteristics and applications are given along with illustrations of typical castings for use in chemical, diesel, and general industrial fields.

7 CENTRIFUGAL FANS — Westinghouse Electric Corp. discusses standard and heavy-duty centrifugal fans for industrial heaters in Catalog 1510. Sections covering construction, installation, application and accessories are included. Performance tables and graphs and an explanation of automatic temperature control are also given.

8 CLUTCHES AND DRIVES—Twin Disc Clutch Co. has released a 16-page "New Products" issue of "Production Road." Five friction and hydraulic drives are described and illustrated, as well as various type clutches.

9 CONTROLLERS — Minneapolis-Honeywell Regulator Co., Brown Instruments Div., offers a 56-page catalog No. 1530, on various types of "ElectroniK" control instruments used to measure and control various process variables. Specifications and ratings for electric and pneumatic type controllers are discussed along with design and construction features.

10 CONVEYOR BELT CARRIERS—Stephens-Adamson Manufacturing Co. has released Bulletin 453 describing and illustrating the 220 Series "Simplex" conveyor belt carriers. Assembly drawings and specification charts are given.

11 CONVEYOR BELTS — Boston Woven Hose & Rubber Co. has released an eight-page rotogravure brochure on its conveyor belts, V-belts, hose and tape. The text is done completely in illustrations with captions.

12 CRANE — American Steel Dredge Co., Inc., Wayne Crane Div., has published an 8-page catalog entitled "Meet the Heavyweights." Descriptions and illustrations of crane Model 20 are given along with specifications, operating data and lifting capacities.

13 CRUSHERS—Gruendler Crusher & Pulverizer Co. has published Bulletin BR 35-10 describing its gravel crushing and screening plants. Plant drawings, equipment part photographs and specification charts are given.

14 DIATOMITE—Johns-Manville has published a 28-pg. brochure entitled "Celite—The Story of Diatomite" which employs photographs and drawings to trace the development of diatomite. It explains what a diatom is; how they emerged into a deposit; the discovery and experiments leading to its use today; current benefits as filter powder for water purification, fertilizers, insulator, etc.; and a brief prediction of its future.

15 DIESEL MAINTENANCE — Caterpillar Tractor Co. has brought out Form 30562, a cartoon-type instruction booklet illustrating the maintenance of its four large type diesel electric sets.

16 DIESEL TRACTORS—The R. H. Sheppard Co. has released a bulletin on its line of diesel industrial tractors equipped with the Baker-Lull Shoveloader. Specification charts and views of the tractors and front-end loaders are given.

17 DUMP BODIES—Gar Wood Industries, Inc. has published Bulletin HB302 featuring its line of dump truck hoists and bodies. Illustrations, specifications and descriptions are included.

18 ELECTRODES—Air Reduction Sales Co. has issued a "Pocket Guide to Electrodes," giving complete details on its line of electrodes.

19 ENGINEERING REPORT—Government Printing Office, Washington 25, D.C., has available "Annual Report 1952, National Bureau of Standards," the Bureau's miscellaneous publication No. 207. Summaries of scientific and engineering investigations conducted by NBS during 1952 are given along with accounts of current activities and descriptions of representative projects. The 81-pg. publication may be obtained at a cost of 30 cents from the Government Printing Office.

20 EXCAVATORS — Pippin Construction Equipment, Inc. has issued two folders describing and illustrating its excavators for use with Ford and Ferguson tractors. Specifications, drawings and photographs are included.

21 FAN DRIVE — Schwitzer-Cummins Co. has issued Form 558, describing and illustrating the Thermatic fan drive for application on heavy-duty engines.

22 FLUID DISPENSER—Oil-Rite Corp. has released Bulletin 82-11, describing and illustrating an air pressure-operated, oil and fluid dispenser. A drawing is given of the dispenser along with specifications.

23 FORK LIFT TRUCKS—Towmotor Corp. has issued a booklet entitled, "How to Use Handcuffs Where They'll do the Most Good," discussing methods of eliminating costly losses through the use of its fork lift trucks. Typical operations are shown and described.

24 GEAR MOTORS—General Electric Co. announced publication of a 16-page Bulletin GEA-1437H, describing the function, design and application of "Tri-Clad" gear motors. Cut-away photographs, application table and maintenance data are included.

25 GYPSUM LATHS AND SHEATHING—Gypsum Association has prepared two illustrated pamphlets describing uses, physical properties and methods of installation of gypsum laths and sheathing. Also included are detailed architectural specifications.

26 INDUSTRIAL TIRES—B. F. Goodrich Co. has published an eight-page booklet explaining industrial tire maintenance and recapping. Inflation rules, load distribution and a mileage cost chart are included.

27 HYDRAULIC MOTORS — Vickers, Inc. has brought out Catalog M-5101 on its hydraulic pumps, controls, power packs, unit valves, power steering and motors. Specifications and engineering information are also listed.

28 JAW CRUSHERS—Gruendler Crusher & Pulverizer Co. has released Bulletin BM-10 giving descriptions, specifications and photographs of the Series "10" jaw crushers, primarily used for gravel and secondary crushing. Typical applications are also illustrated.

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29 LIFT TRUCK—Towmotor Corp. has released an optional features sheet describing the method of operation and construction of its "No Spin" differential, which is used with its lift truck model LT-60. Illustrations of the differential and fork lift truck are given.

30 LOADER—Baker-Lull Manufacturing Co. has released literature describing the construction and industrial uses of the Shoveloader. Applications and attachments are illustrated. Also included are specification lists and descriptions of performance characteristics.

31 MATERIALS HANDLING EQUIPMENT —Kornylak Engineering Corp. has announced its materials handling equipment reference chart. The 50 illustrations are classified into categories of bulk handling, storage equipment, power and hand trucks, truck accessories, cranes and hoists, chain and cable conveyors, etc.

32 MOISTURE TESTER — Engineering Products Co. has released a booklet on the "Speedy" moisture tester for determining the water content of raw, finished or processing materials. Application data and case histories are included.

33 MULTI-STAGE PUMPS — Food Machinery and Chemical Corp., Peerless Pump Div., is distributing Bulletin B-1400, describing its line of multi-stage pumps for supplying, circulating and boosting water and process liquids. Pump cross sections, parts lists, dimensional data, design details and application photographs are given.

34 POWER UNITS—General Electric Co. has published an illustrated bulletin, GEA-5928, describing the advantages, applications and construction of three-phase Inductrol power jacks. An outline diagram, specification and rating tables and voltage regulation data are also given.

35 PROTECTING SLEEVES—A & A Manufacturing Co. announces the availability of Bulletin BA-1, showing various applications of the Gortite sleeve for protecting booms on rock drills; worm drives on welding positioners; lead screws on stone cutters, etc. Methods for attaching the sleeves are shown.

36 PUMPS — Allis-Chalmers Manufacturing Co. describes its single-stage, double-suction, centrifugal pumps in Bulletin 08B6146B. It explains how to figure priming head, gives specification tables and tabulates friction loss. Operation photographs and drawings, explaining construction features, are included.

37 RADIATION DETECTORS — Minneapolis-Honeywell Regulator Co., Industrial Div., has issued a four-page specification sheet, No. 84, describing and illustrating "Radiamatic" radiation detectors. Construction and engineering details are covered.

38 RECORDERS — Minneapolis-Honeywell Regulator Co., Brown Instruments Div., has released three four-page specification sheets describing and illustrating Electronik recording potentiometers. Sheet 160 covers circular chart recorders, 164 and 165 cover single and multiple-record, strip-chart recorders.

39 ROLLER BEARINGS — The Torrington Co., Bantam Bearing Div., has published Bulletin 200-C, revised from 200-B, discussing its self-aligning spherical roller bearings. Specification and lubricant recommendation tables are included. Thread, lock nut and lock washer data is also given.

40 ROLLER CHAINS—Chain Belt Co., Baldwin-Duckworth Div., has prepared Bulletin 52-2 describing and illustrating the features of its riveted roller chain and single pin coupler link. Assembly diagrams and charts for all size chains are presented along with price lists, strengths, dimensions, weights, and boxed assembly specifications.

41 SAFETY POSTERS—The Baker-Raulang Co., Baker Industrial Truck Div., has made up a series of eight safety posters, designed to remind industrial truck operators of safe driving and operating practices. Printed in color on 14- x 22-in. sheets, the posters are done in a bold cartoon style, and are ready for mounting on company bulletin boards. "Be Smart—Be Safe" appears on each poster along with a typical heading for each subject. The complete set may be obtained from the Baker-Raulang Co. All requests must be made on company letterheads.

42 SAND PUMPS—Denver Equipment Co. has published a 20-page bulletin, P9-B8, describing and illustrating the SRL rubber-lined sand pumps. Lists and sectional views of pump parts, clearance and foundation dimensions, water friction, pump capacities, motor selection table and installation and maintenance instructions are given. Case histories and photographs of typical applications are also included.

43 SCRAPER—Euclid Road Machinery Co. presents details and features of the "lever action" 15.5-cu. yd. scraper in a 16-page catalog folder. Also included are the features of its 275 hp., four-wheel tractor.

44 SHIPPING BAGS—Kraft Bag Corp. has released a brochure on "Kraft-lok," a valve-type gussetted bag for packaging free-flowing granular or pulverized materials. Typical application illustrations are also shown.

45 SPEED DRIVES—Reeves Pulley Co. describes and illustrates the Flexi-Speed Drive in Bulletin V-532. Rating tables, shaft center distances and complete dimensions are listed.

46 STORAGE SYSTEMS — The Marietta Concrete Corp. has prepared a 12-page catalog discussing modern industrial storage systems. Construction details, a capacity chart and typical application photographs are included.

47 TEMPERATURE CONTROLS — Minneapolis-Honeywell Regulator Co., Brown Instruments Div., has released a four-page specification sheet, No. 116, describing and illustrating Pyr-O-Vane, Pulse Pyr-O-Vane and Protect-O-Vane automatic controllers for temperature regulation. Construction and engineering details are given.

48 VALVE PUMPS—The Farval Corp. has prepared Bulletin 39 describing the DC-20 pumping unit, intended for use with Farval Dualine valves. Its use for automatic centralized lubrication is described and drawings show details of its operation. A specification table is also included.

49 V-BELTS — Raybestos-Manhattan, Inc., Manhattan Rubber Div., has announced a fractional horsepower V-belt catalog. Belt and various type machine lists are included to aid in determining proper belt applications.

50 VIBRATING SCREENS—Universal Vibrating Screen Co. has available Bulletins 125, 65 and 140, describing and illustrating various type vibrating screens, including electrically-heated and high-speed screens. Specifications, installation and operating data are also given.

51 WIRE ROPE—Macwhyte Co. has released Booklet 5312, presenting a picture-story tour of wire rope manufacture.

52 WIRES & CABLES—United States Rubber Co. has published a 76-page booklet entitled "U.S. Electrical Wires and Cables for the Chemical and Petroleum Industries." The booklet is divided into four main sections: Insulation compounds; jacket compounds; construction; and technical data.

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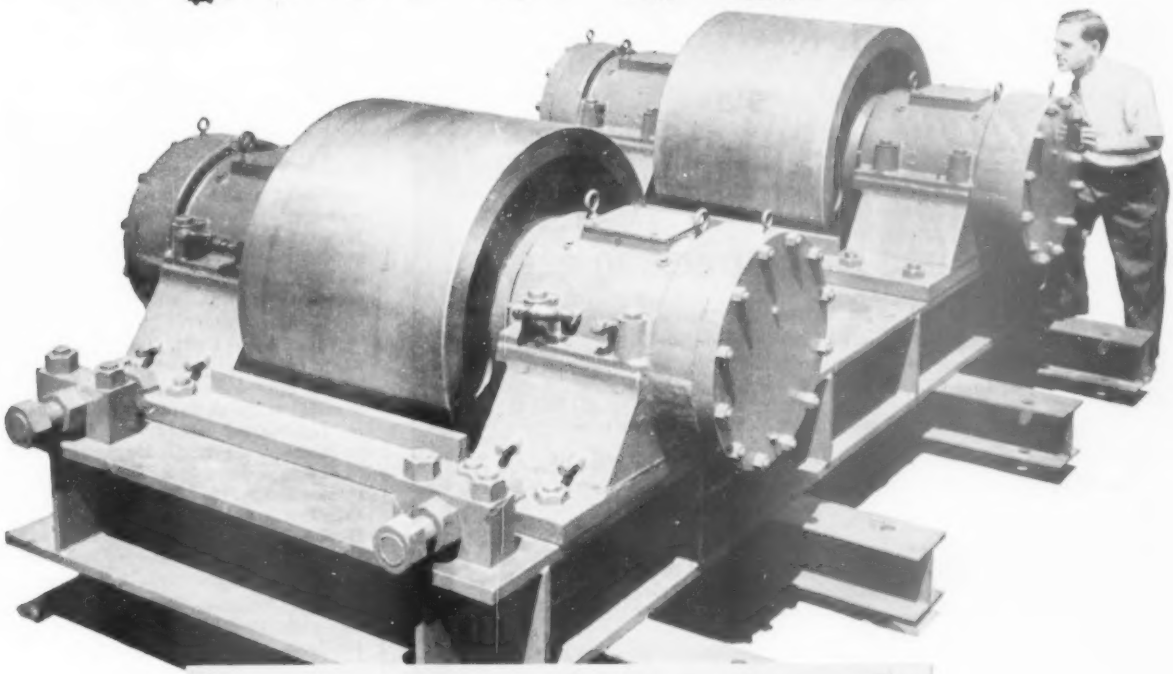

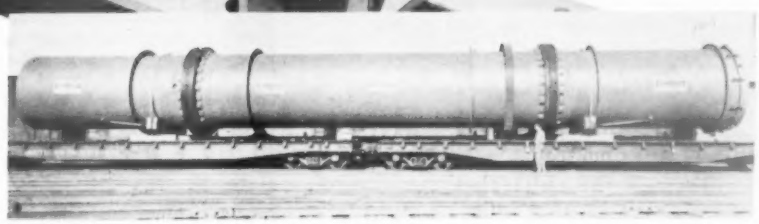

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Take a look at the ruggedness of the trunnion assembly pictured in the top photograph. These are trunnions for a 10 ft. diameter by 150 ft. long *STANDARD* kiln, just completed. Another *STANDARD* kiln mounted on flat cars, ready for shipment, is shown in the inset photograph. Both illustrations tell more graphically than words why *STANDARD* so often gets the CALL when the need is for rugged dependability. There's nothing skimpy about *STANDARD* Rotary Equipment. It is built *to last*, like the Company behind it. Now celebrating our 50th year of heavy engineering progress. WRITE *TODAY* FOR FULL DESCRIPTIVE LITERATURE

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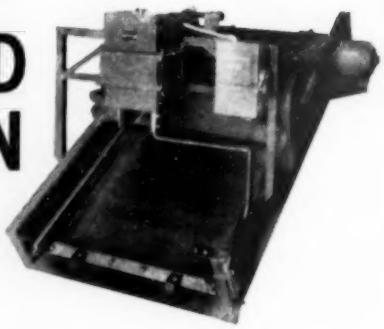

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Really tough screening jobs . . . such as fine mesh screening of damp lime, ag-lime and silica sand . . . are made easy and profitable with the FlexElex equipped Leahy Screen. Look at the record:

★ The Leahy is the original no-blind vibrating screen.

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Manufacturers News

(Continued from page 113)

manager, and Thomas R. Zelinsky, formerly a sales representative in Detroit, will be associated with him in the new dealership, to be known as Morrison Industrial Equipment Co., Grand Rapids, Mich.

General Electric Co., Schenectady, N.Y., has announced the following appointments in the medium induction motor department: George I. Clover, manager of manufacturing; Glenn A. Cook, manager of finance; Charles J. Koch, manager of engineering; Joe T. Farrell, manager of marketing; Karl F. Lathrop, manager of employe relations; and Dwight E. Moorhead, manager of the San Jose, Calif., plant. Walker H. Henry, manager of the new marketing department, announced establishment of a product planning practices section with Edward A. Green as manager.

Hoyt Wire Cloth Co., Lancaster, Penn., is now providing a complete line of aggregate wire screens and industrial wire cloth at its new plant in Lancaster, according to an announcement by F. G. Hoyt, president of the new firm. Machinery was purchased from John A. Roebling's Sons Co., Trenton, N.J. Mr. Hoyt and Wm. Hobbs, Jr., vice-president and sales manager, were formerly associated with Roebling's.

S. K. Wellman Co., Bedford, Ohio, has completed the move into its new Bedford plant, which covers over 100,000 sq. ft. of factory area. An additional 95,000 sq. ft. is devoted to engineering laboratory and office space, forming a complete manufacturing and research center devoted to development and production of sintered metal clutch plates, facings and brake linings.

Gardner-Denver Co., Quincy, Ill., announces that Robert H. Pearson has retired as vice-president after 37 years of service with the company, to assume management of Air Rentals, Inc., Denver, Colo., newly formed distributor for Gardner-Denver equipment, also equipment and supplies for quarry operators and mines.

Thor Power Tool Co., Aurora, Ill., is the new name of the Independent Pneumatic Tool Co. Stockholders voted to change the 60 year old corporate name for easier recognition of the company's products under the trade name "Thor."

Wood Mfg. Co., North Hollywood, Calif., has appointed the Power Equipment Co., Knoxville, Tenn., as distributor for eastern Tennessee, and the Carey Hall Machinery Co., Salem, Va., for the State of Virginia.

Sturtevant Mill Co., Boston, Mass., has acquired all interests for the Micronizer manufactured by the Micronizer Co., Moorestown, N.J. This includes all rights of manufacture and sales including the registered trademarks and goodwill of the company. The Micronizer is a jet pulverizer for

grinding or reducing solids into micron ranges. Among the many applications are titanium dioxide, talc, barytes, cryolite, mica and other rock products materials.

Allis-Chalmers Mfg. Co., Milwaukee, Wis., has combined the district and branch office territories of Denver, Salt Lake City, Phoenix, El Paso and Spokane into the Rocky Mountain Region with headquarters at Denver. Richard D. Moody, manager of the Los Angeles district office, has been appointed manager of the new region. Richard L. Engel succeeds Mr. Moody at Los Angeles.

Clark Equipment Co., Battle Creek, Mich., announces that John A. Borman has returned as assistant to Robert H. Davies, vice-president, on engineering and production problems. Russell Hastings, formerly with Lewis-Shepard Co., has been appointed assistant to A. O. Williams in directing the activities of the engineering staff.

Leeds & Northrup Co., Philadelphia, Penn., has announced formation of Integra-Leeds & Northrup Ltd., Birmingham, England, as successor to The Integra Co., Ltd. Announcement was made jointly by Charles S. Redding, president of L&N, and Maurice Bouffart, managing director of S. A. Integra, Liege, Belgium.

Pangborn Corp., Hagerstown, Md., has available a six-page, pocket-size folder entitled "Desk Calculator," presenting formulas, constants and conversion factors useful in basic engineering, blast cleaning and dust-control calculations.

The Dow Chemical Co., Midland, Mich., announces the opening of its new Edgar C. Britton research laboratory, named in honor of its organic research laboratory director, who has been a member of the firm since 1920 and director of the laboratory since 1932.

Mack Trucks, Inc., New York, N.Y., has announced the appointment of K. L. Fitts as manager of off-highway truck sales for Mack Truck Corp. He was formerly assistant manager of the division and succeeds P. J. Fleming who has retired after many years of service with the company.

Stearns Mfg. Co., Inc., Adrian, Mich., announces the appointment of James J. Collins as district manager in the state of Illinois and adjacent territory. Mr. Collins has been associated with the concrete products industry since 1929 and formerly served the City of Chicago and the State of Illinois as materials testing engineer. In 1937, he formed the Universal Cast Stone Co., Joliet, Ill., which manufactured lightweight concrete products and architectural cast stone. In recent years, Mr. Collins has represented machinery companies and other manufacturers serving the concrete products industry in Illinois and Indiana.

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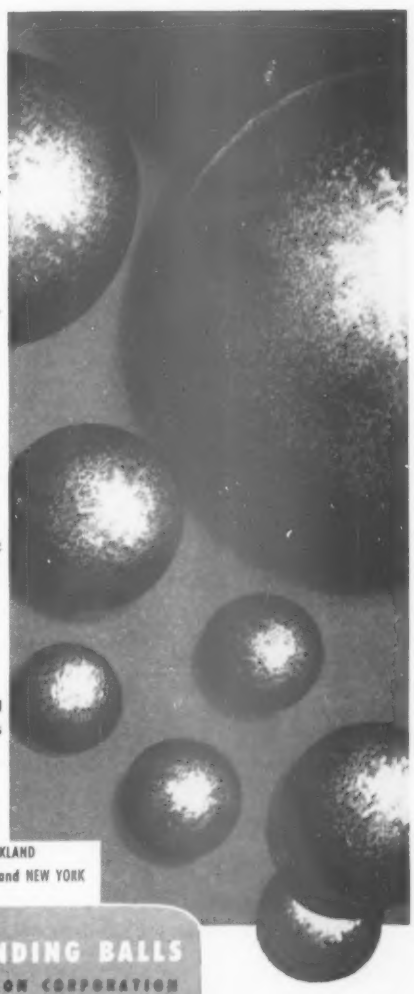

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1269 CENTER AVENUE, CHICAGO HEIGHTS, ILLINOIS

PUMPS FOR ABRASIVE AND CORROSIVE APPLICATIONS

Agstone Directors' Meeting

(Continued from page 108)

In view of reductions in exports of farm products and reduced farm income, the committee expressed the opinion that the industry needs higher prices for its product so that it can afford adequate advertising and make its product more attractive, profit-wise, to dealers. It was further recommended that funds be raised for distribution of pertinent re-printed articles from the tradepress and that personnel be hired for this promotion.

Buford Everett was elected to replace W. R. Clarke, Plattsburg, Mo., deceased, on the board of directors and an appropriate resolution of sympathy in Mr. Clarke's death was passed, to be sent to his widow and family.

The membership committee reported that there are 1100 agricultural limestone producers in the country, with some 220 members pledged thusfar to emphasize the job ahead.

Next annual meeting of the N.A.L.I. will be February 19-20, 1954, at the Blackstone Hotel, Chicago, Ill., with the directors meeting on February 18. The program was outlined in detail and falls between the national conventions of the sand and gravel and ready-mixed concrete industries, and the crushed stone industry. Thus producers can avail themselves of opportunity to inspect the machinery expositions of those industries, to be held at the Conrad Hilton Hotel.

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___Belt Repair Equipment
___Bin Level Indicators
___Bins and Batching Equipment
___Bits
___Blasting Supplies
___Block Machines, Concrete Building
___Bodies, Trailer
___Brick Machines and Molds
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___Derricks
___Dewatering Equipment, Sand
___Diesel Engines
___Dragline Cableway Excavators
___Draglines
___Dredge Pumps
___Drilling Accessories
___Drills
___Dryers
___Dump Bodies
___Dust Collecting Equipment & Supplies
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___Engineering Service, Consulting and Designing
___Explosives & Dynamite
___Fans and Blowers
___Feeders
___Fifth Wheel, Heavy Duty Special
___Flotation Equipment
___Front End Loaders
___Gasoline Engines
___Gear Reducers
___Generator Sets
___Grinding Media
___Gypsum Plant Machinery
___Hard Surfacing Materials
___Hoists
___Hoppers
___Kilns: Rotary, Shaft, Vertical
___Locomotives
___Lubricants
___Magnetic Separators
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___Screen Cloth
___Screens
___Scrubbers: Crushed Stone, Gravel
___Shovels, Power
___Speed Reducers
___Tanks, Storage
___Tires and Tubes
___Torque Converters
___Tractor Shovels
___Tractors
___Trailer Dump Bodies
___Trucks, Bulk Cement
___Trucks, Industrial
___Trucks, Mixer Body
___Trucks, Motor
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___Vibrators
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___Winches
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If equipment you are in market for is not listed above, write it in the space below.

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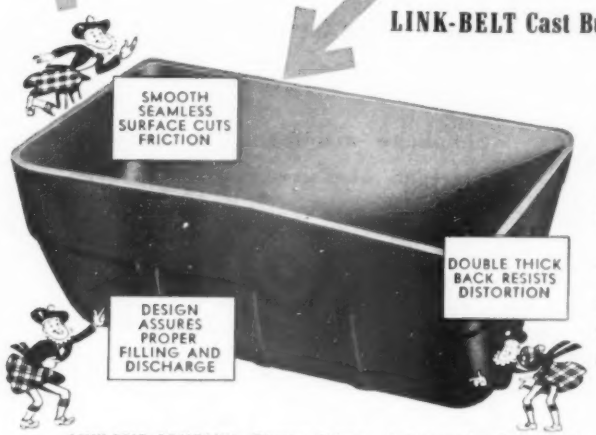
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YES, Link-Belt Cast Buckets are durable. Made of the highest grade malleable iron or Promal (the stronger, longer wearing metal)—they resist abrasion and corrosion . . . stand up better under day-in, day-out usage. Improved casting methods assure uniformity. And special construction features help build their reputation for improved performance.

Find out how Link-Belt Cast Buckets can save you money. There are many styles and sizes available for a wide range of applications . . . for either chain or belt mounting. Steel buckets of various designs are also furnished. Call your Link-Belt sales representative or distributor for local stocks and information.

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LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle, Toronto, Springs (South Africa), Sydney (Australia). Sales Offices, Factory Branch Stores and Distributors in Principal Cities.

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CLEVELAND 5, OHIO and East Chicago, Indiana

Why Allis-Chalmers POWER UNITS cost less to operate

1. Removable cylinder sleeves on all models.

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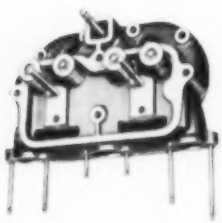

3. On large engines one interchangeable head to each two cylinders permits one man to make adjustments right on the job.

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MODEL	RPM	MAXIMUM BRAKE HP.
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WOVEN WIRE SCREENS

- ACCURATE
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Simplicity maintains big stocks of aggregate wire screens, already woven, in an adequate range of openings and a choice of wire gauges . . . edges formed promptly for any type vibrator. Excellent service.

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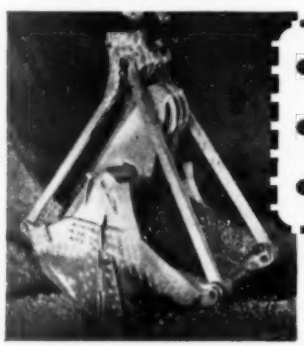
DESIGNED FOR HANDLING



- CEMENT CLINKER
- LIMESTONE
- GYPSUM ROCK

For complete information, construction details and specifications . . .
WRITE FOR BULLETIN 2378

BLAW-KNOX Buckets are built especially for low-cost handling of bulk materials in cement plants. Tight fitting lips of cast chrome-nickel-molybdenum alloy steel prevent leakage and resist abrasion to insure long dependable service. Available in a wide selection of capacities and weights to get the most from your crane.

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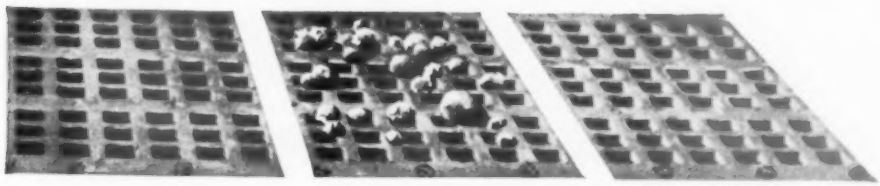
BLAW-KNOX CLAMSHELL **BUCKETS**
FOR CEMENT PLANTS

Before... and... After...



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Hendrick Perforated Metal Plate assures a long life of service on vibrating and shaking screens. Available in any desired shape or size of perforations, it can also be supplied flat or corrugated in proper gauges of regular, high carbon, and high tensile steels and in other commercially rolled metals.

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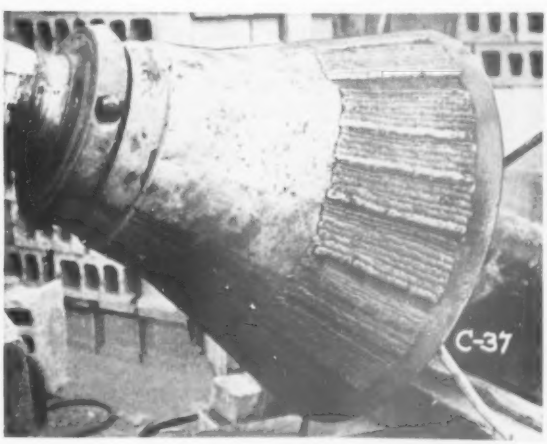


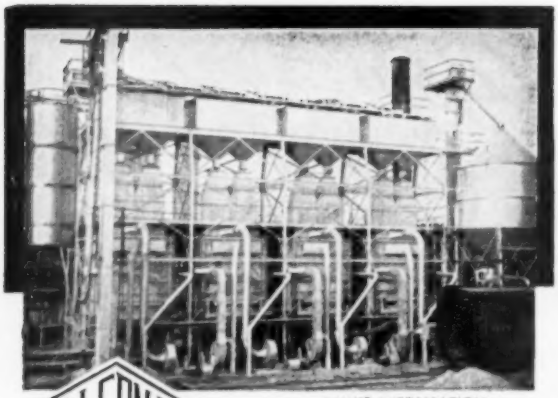
Before and After Applying N. M. MANGATONE and RESISTO-LOY

This rebuilding job on Gyratory Liners was accomplished economically despite the fact that well over an inch of deposited metal was required all around the bottom third. Note the very badly worn areas in the "before" picture. Then note the perfectly done, finished job.

This rebuilding was done by the plant maintenance welder, using our N.M. Mangatone to rebuild the liner and making the last pass over the lower 15 inches with Resisto-Loy. This final coating pays a fine dividend in additional wear resistance.

Why not put in a call for our field man? He can show you many ways to save materials and money.

RESISTO-LOY COMPANY - Grand Rapids 7, Michigan



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For Burning LIMESTONE, DOLOMITE, etc.

PREHEATS - CALCINES - COOLS
AUTOMATIC CONTINUOUS OPERATION
MINIMUM FUEL CONSUMPTION

There are extra dividends available in the operation of your plant when you use Ellernan Calciners . . . let us explain the exclusive features . . . write today for literature and detailed information applicable to your operation.

THE ELLERNAN CO.
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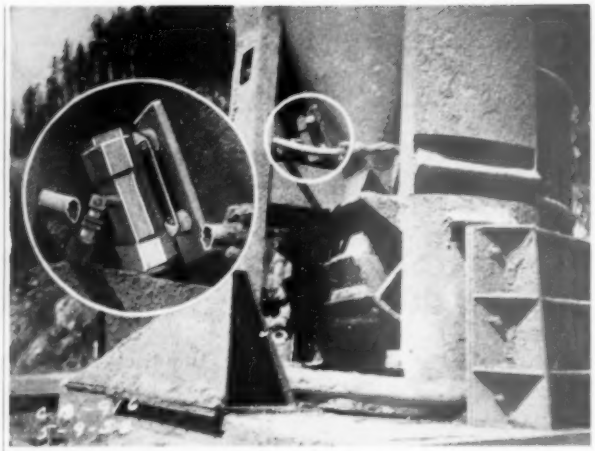

..We Finished on time. thanks to BRANFORD Vibrators"

That's what the contractor said. He was constructing a large hydro-electric dam in the Pacific northwest. A big volume of concrete had to be poured before the Spring high water.

The huge buckets he was using would discharge in about 2½ minutes but that wasn't fast enough. Even with a round-the-clock schedule, the job couldn't be done on time.

However, by installing powerful BRANFORD vibrators (3" dia. piston) on the buckets he emptied them in 15 seconds and beat the deadline!

BRANFORD vibrators will help you break similar bottlenecks.

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CONTINUING NEW HAVEN VIBRATOR COMPANY
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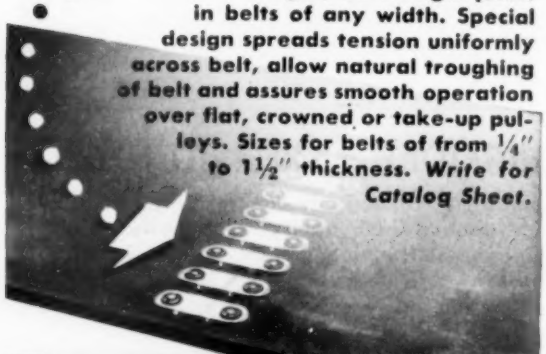
PLATEGRIP
PLATE FASTENERS FOR CONVEYOR BELTS



Make strong dust-tight, water-tight joints in belts of any width. Special design spreads tension uniformly across belt, allow natural troughing of belt and assures smooth operation over flat, crowned or take-up pulleys. Sizes for belts of from ¼" to 1½" thickness. *Write for Catalog Sheet.*

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A SECTION OF ROCK PRODUCTS

CONCRETE UNITS . READY-MIXED CONCRETE

Pre-mix batching plant of
Twin City Ready Mix Concrete Co., Minneapolis, Minn.

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I'm "Thrifty"
I help you cut production costs! How? By reducing the number of culls and throwbacks. Manufacturers using Duraplastic find there is less breakage in handling green products. Are you having too much breakage?
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And I help put "sell" in your machine-made concrete products! Manufacturers report that clean, true edges and corners of Duraplastic-made products are a definite sales advantage. Face texture is richer, especially when harsh aggregates are used. Thus appearance of finished block is improved.

WE'RE EASY TO WORK WITH—With Duraplastic, you can make a more cohesive, rubbery mix which holds together better, feeds easily through machines. Excellent for concrete block, brick, pipe, drain tile and silo staves.

AND WE'RE ON THE JOB, RAIN OR SHINE—Users of Duraplastic-made products report increased resistance to passage of water through finished products: a good selling point for your products.

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It sells at the same price as regular cement and requires no unusual changes in procedure. Complies with ASTM and Federal Specifications. For descriptive booklet, write Universal Atlas Cement Company (United States Steel Corporation Subsidiary), 100 Park Avenue, New York 17, N. Y.

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AIR-ENTRAINING PORTLAND CEMENT

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INDUSTRY NEWS

Concrete Products Meeting

THE CONCRETE PRODUCTS MANUFACTURING ASSOCIATION OF SOUTH DAKOTA recently held its annual meeting in Pierre, S.D., with representatives from North and South Dakota, Wyoming and Minnesota in attendance. Speakers at the meeting included Prof. Dennis Moe, Agricultural Engineering Department, South Dakota State College, who spoke on research development in South Dakota shales for concrete use; Ray Minnette, president, Wisconsin Manufacturers Association; W. P. Markert, Chicago, Ill., director of promotion, National Concrete Masonry Association; Bill Gage, Jr., Sioux Falls, S.D., who discussed plastic-surface concrete block and prestressed block for bridges; and Elmer Clasen, Mandan, N.D., who spoke on Dakota Haydite as a concrete aggregate.

Demonstration Home

THE "HAYDITE" HOUSE shown in the accompanying illustration was the exhibit of The Carter-Waters Corp., Kansas City, Mo., at the 1953 Greater Kansas City Home Show which was attended by over 100,000 persons.

The Carter-Waters exhibit consisted of a full-scale section of an all-masonry home being built by the company as an exhibition house to promote the sale of its products. The architectural model shown at the left of the illustration, and the floor plan mounted on the wall were used to aid the show visitors in visualizing the completed home. The full-scale section of the house showed the actual materials and method of construction.

The exhibit featured 6-in. Haydite concrete block and SCR brick walls to which furring strips, lath and plaster were applied. Cutaway portions demonstrated this method of construction. Roof construction consisted of conventional wood framing with a built-up roof, using white marble chips as gravel. The Soffit block floor system was illustrated by use of a model. Truscon steel sash, Blok-Mesh wall reinforcing and precast Haydite concrete window sills and stepping stones completed the demonstrated products either manufactured or handled by the company.

The high public interest evidenced at the home show seemed to give every indication that a well designed and carefully built masonry demonstration house has promotional value.

Cover Picture

TWIN CITY READY MIX CONCRETE CO., Minneapolis, Minn., has rebuilt its batching plant to permit production of both pre-mixed and transit-mixed concrete. Illustration shows a mixer truck leaving with a load, and the truck at the right ready to back in for its load. No delays are experienced in winter as plant and bins are heated. Details of this interesting operation are found in an article in this issue.

Concrete Pipe Plant

LONGHORN CONCRETE PIPE CO. is building a $150,000 concrete pipe plant at Edinburg, Texas. A pilot plant is now in operation and the new plant is expected to be completed early this summer. Pipe will be produced in sizes up to 12 ft. in length and 72 in. in dia. F. M. Reising is principal owner of the company.

Repurchases Company

HADLEY SUPPLY CO., INC., which was one of the subsidiaries of Miami Crushed Stone Co., recently purchased by Maule Industries, Inc., has been repurchased by the G. D. Monroe family, formerly part owners of the Hadley Supply Co. Since the repurchase, Victor Hadley has been named president.

Full-scale section of all-masonry home exhibited at 1953 Greater Kansas City Home Show. Architectural model at left and floor plan mounted on wall aided visitors in visualizing completed home

GARNER READY-MIX AND CONSTRUCTION CO., Garner, Iowa, is opening a branch plant at Belmond, Iowa, for the production of ready-mixed concrete. The new plant will be under the management of B. B. Schoneman of Garner, who has been associated with the company for a number of years.

CARL J. KILIAN, Mascoutah, Ill., recently purchased Murdock Fuel and Supply Co., Greenville, Ill., and will operate the plant under the name of Kilian Concrete Products, Inc. Former owner was Gerald Murdock. The company produces concrete block, brick, sand, gravel and chat.

A READY-MIXED CONCRETE PLANT at St. Johnsbury, Vt., formerly owned by Kenneth Curran of Littleton, N.H., has been sold to Calvin Carpenter, St. Johnsbury, formerly plant manager. Present plant facilities include a transit-mixer truck and a three-compartment storage bin.

C. M. JOHNSTON & SONS, INC., has added a ready-mixed concrete plant to its concrete-block operations at Helena, Ark. New facilities include a 100-ton aggregate bin, a 600-bbl. bulk-cement bin, and two transit-mixer trucks.

BLOCK AND TILE CO. has been established at Norton, Kan., by Bob Kellogg, formerly associated with Clyde Goble Implement Co. The company will produce concrete and pumice block.

PORTLAND INDUSTRIES, INC., has completed a $500,000 expansion program at the recently acquired Wilson Concrete Products, Inc. concrete block and ready-mixed concrete plant at West Palm Beach, Fla.

THE CORTEZ READY-MIX PLANT recently began operation at its new location, east of Cortez, Colo. Plant facilities include cement and aggregate storage bins and two transit-mixer trucks.

A READY-MIXED CONCRETE PLANT has been established at Hillsboro, Texas, by Sid Williams. Plant equipment includes a hopper, crane, batching plant, and two transit-mixer trucks.

BRIGHTON SAND AND GRAVEL CO., Sacramento, Calif., recently announced plans to build a new $60,000 concrete batching plant in West Sacramento.

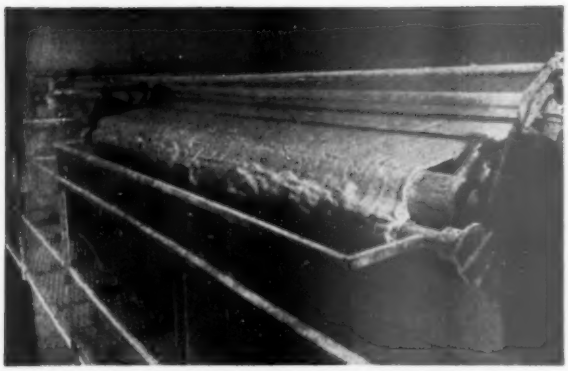
G. E. KLEPINGER, concrete block producer, Stark City, Mo., has opened a ready-mixed concrete plant at Neosho, Mo.

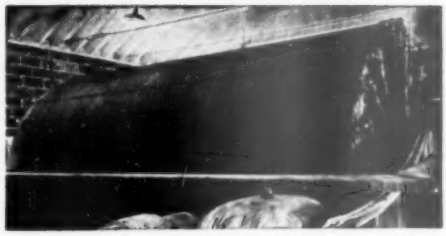
NORTH WEBSTER LUMBER AND SUPPLY CO., has opened a ready-mixed concrete plant at Syracuse, Ind.

CONCRETE BLOCK CO., Eldora, Iowa, has been purchased by Martin Owings. Former owner was E. J. Clarey.

A READY-MIXED CONCRETE PLANT has been established in Paulding, Ohio, by Bernard Workman.

FASTER–MORE ECONOMICAL WAY TO MAKE LIME PUTTY





Above: Discharge of Processed Lime Putty into receiving hopper. Note thickness of lime mat (1½").

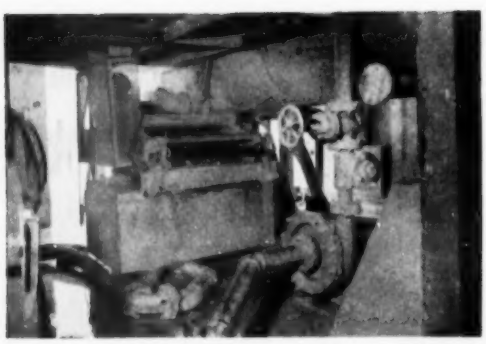
Right: Coil springs on filter drum.

of Uniform High Quality

NOW you can produce high-quality Lime Putty in a fraction of the time, with greatly reduced work, less ground space for equipment, and at lower cost. Two men can operate the plant.

This revolutionary new Miller-Komline Process assures uniformity of quality, and produces a cool putty ready for immediate use by plasterer or bricklayer. Lime putty of varying density can be produced according to customer requirements.

Ready-mixed Concrete Producers having surplus truck mixers can readily diversify their business, guaranteeing more continuous use of their equipment through production of ready-mixed brick mortar.



Underside of slaker, vibrating screen, and pump to filter.

A new, revolutionary process. Differs from plants now in use in the following principal ways:

- Eliminates the large, expensive "aging" vats or tanks, along with time for cooling and dewatering the putty.
- Putty produced through this process requires no "aging." The time element is literally reduced from days to minutes.
- The putty is completely conditioned for immediate use by the mason as it leaves the machine.
- Samples of putty taken from any part of the machine are always uniform with respect to coolness and consistency.
- In the case of ready mixed mortar plants, the Miller-Komline Process can be used satisfactorily with either high calcium or dolomitic quicklime.
- Greater capacity per dollar of investment is obtained with this process over other putty plants employing the "aging" tank principle.
- It is very simple to operate. It is low cost.

EXCLUSIVE PATENT LICENSES ISSUED TO QUALIFIED PARTIES

WRITE FOR INFORMATION ON HOW THIS NEW PROCESS CAN INCREASE YOUR VOLUME AND PROFITS

SERVICE ENGINEERING CO.

HOWARD B. BISHOP, *President*

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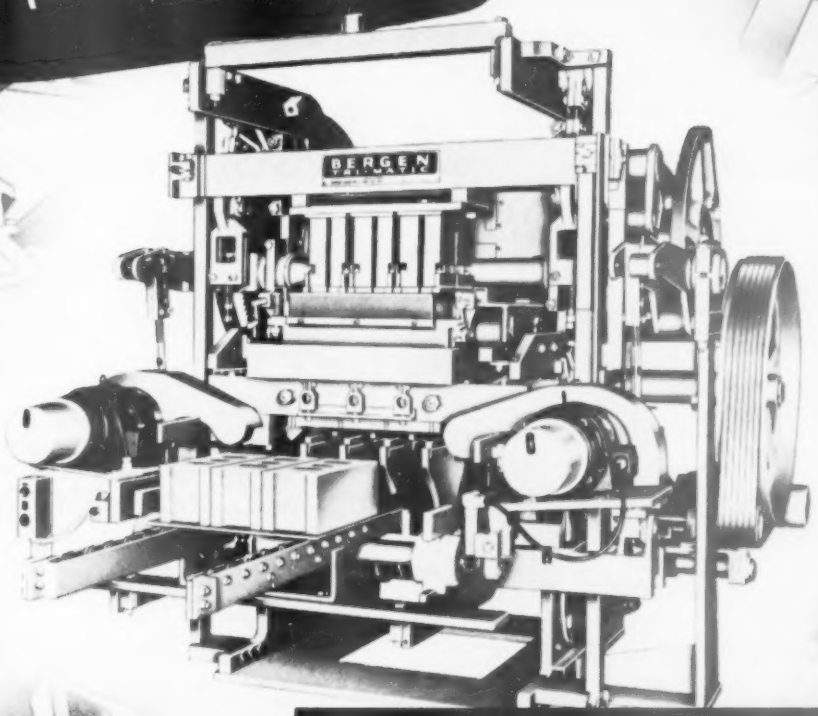
1,000 BLOCK PER HOUR
(8" EQUIVALENT)



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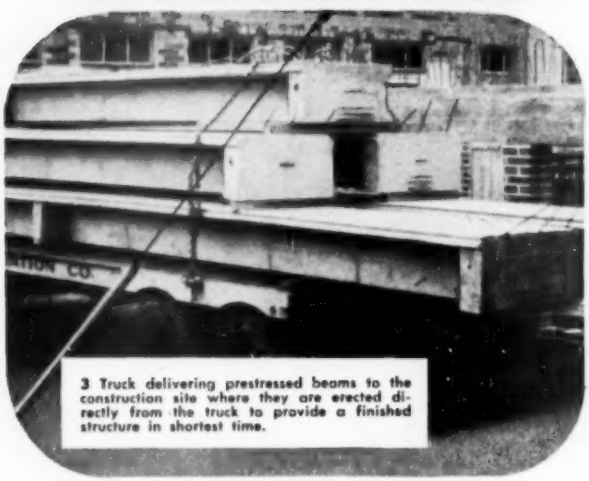
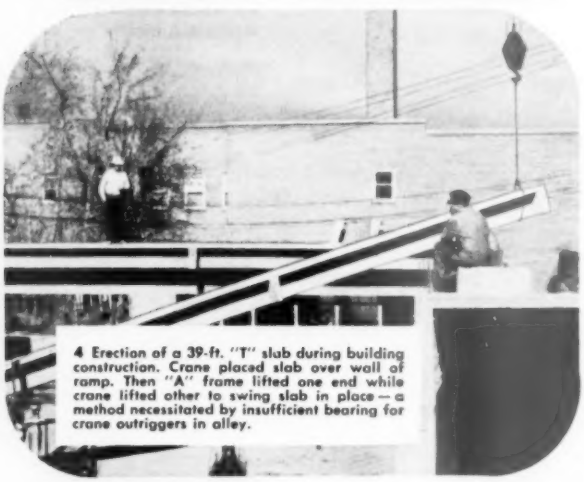
PRESTRESSED CONCRETE

1 Plant of Prestressed Concrete of Colorado, Inc., includes a 280-ft. casting bed, 10 ft. wide. Two hydraulic jacks have a total stressing capacity up to 300 tons. Photo shows forms for a "T" beam in place on the bed.

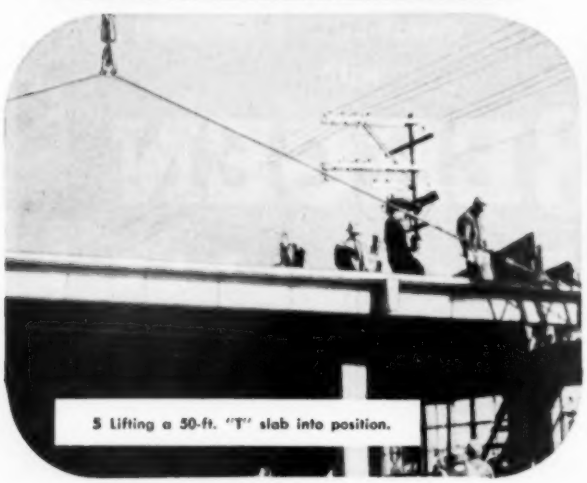
2 Side view of pretensioning bed showing removal of a 39-ft. "T" slab. This picture and that at the left show intermediate stub columns, 20 ft. apart, behind which portable anchorages can be dropped.



3 Truck delivering prestressed beams to the construction site where they are erected directly from the truck to provide a finished structure in shortest time.



4 Erection of a 39-ft. "T" slab during building construction. Crane placed slab over wall of ramp. Then "A" frame lifted one end while crane lifted other to swing slab in place — a method necessitated by insufficient bearing for crane outriggers in alley.



5 Lifting a 50-ft. "T" slab into position.

6 Beam framing at a packing plant. Plates cast in top of beams to receive wood purlins which carry wood roof and beef rails. Diagonal span 25 ft.; others 18 ft.

PRODUCTION LINE!

Single plant quickly reached daily volume of 1120 ft. of structural members to meet demand

ALMOST UNLIMITED POSSIBILITIES await the fabricator of prestressed concrete structural members. One of the first in this field, Perlmutter & Sons Co., of Denver, built a 48-ft. casting bed as a pilot plant. They cast a wide variety of shapes and sizes and learned the angles. Then, as Prestressed Concrete of Colorado, Inc., they built a 280-ft. casting bed. Completed last October, this plant produced 560 linear ft. of beams, girders, roof and floor slabs daily. By February this was increased to 1120 ft.

By June 1, 1953 Prestressed Concrete of Colorado had supplied 130,347 sq. ft. of 100% prestressed concrete roof plus beams to support an additional 25,700 sq. ft. of wood and lightweight slab.

Both casting beds were designed by Phillips-Carter-Osborn, Inc., of Denver, after consultation with Roebling. Six different architectural firms in the area have employed them to design the prestressed concrete members for many structures including the three illustrated on these pages.

• • •

Roebling has pioneered in adapting the principles of prestressed concrete to American practices. Roebling is a major supplier of strand for pretensioning—in Regular and SR (stress-relieved) grades—and of end fittings and strand for post-tensioning.

Based on its experience in this field, Roebling can furnish data and suggestions on the design and operation of plants for fabricating prestressed concrete structural members. Inquiries will be welcome from everyone interested in building such plants and in capitalizing on the most revolutionary and profitable trend since structural steel came into the picture. Prestressed concrete compares favorably with steel cost-wise, and its unique advantages assure a practically unlimited future.

Architects, engineers and builders are invited to write for the Roebling prestressed concrete story.

Address Prestressed Concrete Dept.
JOHN A. ROEBLING'S SONS CORPORATION
Trenton 2, New Jersey

A subsidiary of The Colorado Fuel and Iron Corporation

7 Placing a double "T" slab during erection of a cold storage plant. Average placement time was three minutes per slab.

8 Same as above. Top view of slabs in place before the lifting hooks were burned off.

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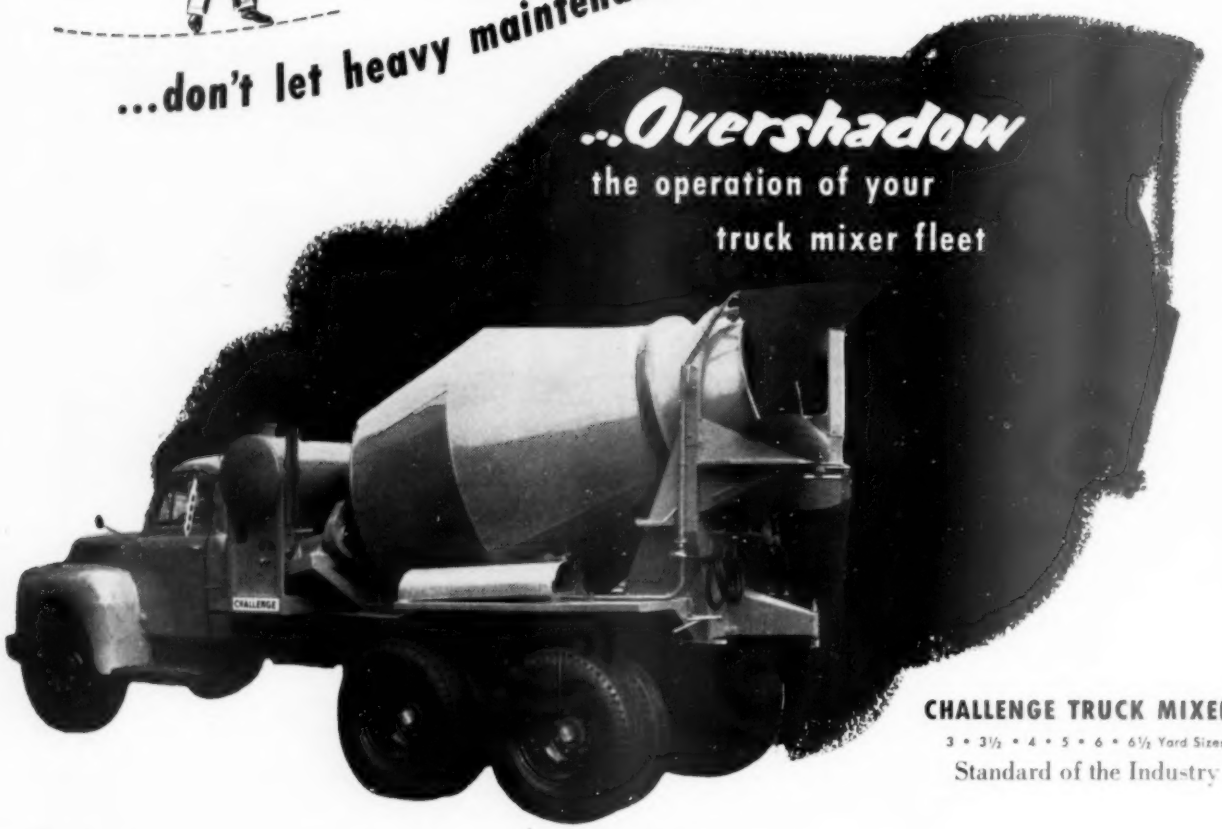
ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. & 5 PITTSBURGH ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13229 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 815 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5348 E. HARBOR ST. & 120 S. HEWITT ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • PITTSBURGH, 1301 CLARK BLDG. • ROCHESTER, 1 FLINT ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • ST. LOUIS, 3001 DELMAR BLVD. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, TRENTON 2, NEW JERSEY

...don't let heavy maintenance and repair costs

...Overshadow the operation of your truck mixer fleet



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3 • 3½ • 4 • 5 • 6 • 6½ Yard Sizes

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Challenge mixers cost LESS TO OPERATE . . . TO MAINTAIN

MEMBER N.R.M.C.A.

FIRST: Challenge Mixers are extremely simple in design, yet of rugged, sturdy construction. They are completely functional in every respect... no useless gadgets... no unnecessary parts to operate and maintain.

SECOND: The exclusive Challenge Patented "DAM" works as a team with the continuous "Thoro-Mix" mixing blades and reverse fins in the drum. Together they not only enable Challenge Mixers to work perfectly and assure properly mixed, uniform concrete, but they eliminate entirely the discharge gate and drum seal, WITHOUT SPILLAGE.

THIRD: By using standard, industrial equipment, transmission and clutch assembly maintenance is held to a minimum... AND, repair and replacement parts are immediately available from local parts dealers — ***everywhere!*** Low maintenance expense is a definite requirement to a profitable operation. Investigate these costs thoroughly before you buy... you will find that Challenge costs less ***after you buy it.***

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Exclusive National Distributor For CHALLENGE TRUCK MIXERS... *Standard of The Industry*

Rebuild Plant for Both Transit and Premixed Concrete

Twin City Ready Mix Concrete Co., Minneapolis, Minn., has interesting batching control system and simple records for daily reports and truck schedules

Photo courtesy Construction Bulletin

R. Lindh, superintendent of the plant, standing in front of two of the company's mixer trucks

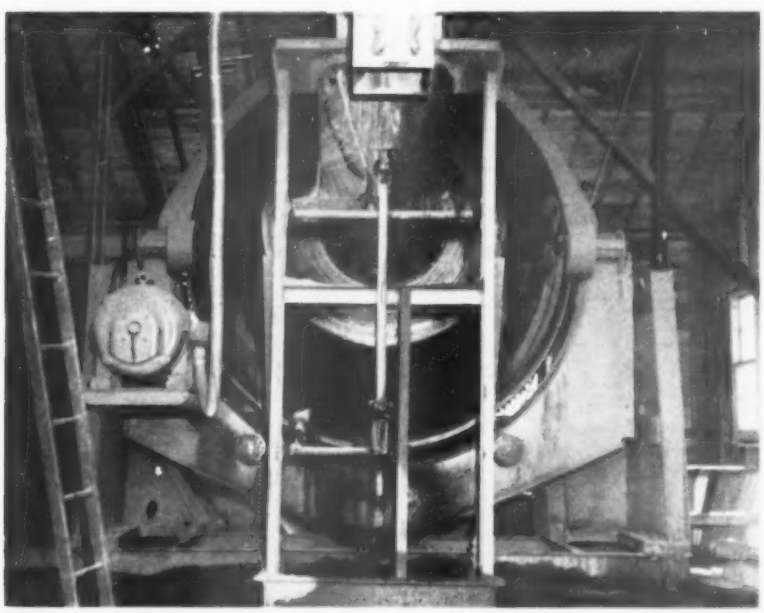
By L. A. CASTELL

WHEN TWIN CITY READY MIX CONCRETE CO., Minneapolis, Minn., switched from transit-mixed to pre-mixed concrete production recently, not a single operating hour was lost, despite the Herculean task of underpinning the existing Butler plant.

A new 4-cu. yd. 112S Smith tilting-type mixer had been purchased; but R. T. Lindh, superintendent, under whose direction the change-over was made, wanted to retain the flexibility of loading transit-mixed concrete under the weigh batcher as insurance against a breakdown. This entailed excavating and building a grade-level mixer, compressor, and storage room under the tower, and going down 18 ft. into the ground with columns and footings to support the bins and scale floor.

While transit-mix production continued as usual, piling was driven and the tower was suspended on two 12- x 27-in. steel I beams, 66 ft. long. Permanent columns and footings were placed. An office overlooking the mixer room was added. A wide driveway was sloped to the new lower level and flanked with a concrete retaining wall. On a Friday afternoon in September, four months after the project started, the plant shut down for the week-end as usual. Friday night, Saturday, and Sunday were spent in installing the mixer; and Monday morning, the trucks rolled out loaded with pre-mixed concrete.

The new plant is a model of efficiency and flexibility. All that is necessary to change from pre-mixed to transit-mixed concrete production is to throw a lever so that the truck mixer drum, and not the plant mixer, is charged.



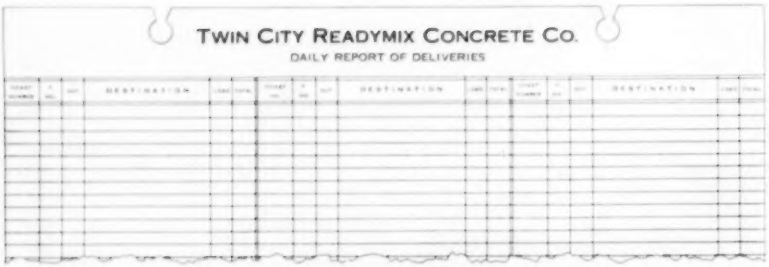
Charging end of 4-cu. yd. tilting-type mixer which receives aggregates, cement and water from the weigh batcher on the floor above

Pre-Mixing Plant

Installed at a cost of $70,000, the pre-mixing operation has now gone through one winter and is proving even more satisfactory than was expected.

"It's a tremendous step forward, so far as we're concerned," Mr. Lindh commented. "Other winters, we had to get here at 5:30 a.m. to thaw out the ice in the scale hopper. Now all we do is push a button and go to work. We're completely enclosed, and our tower is as warm as toast, because of the heated mixer room below. I felt the room should be heated so the mixer would operate properly and get adequate lubrication. We're certainly glad we did it that way. Other advantages are a better mixed product, faster loading, and better quality control. Pre-mixed concrete has been very well received by our customers. They realize they're getting a better product."

The Smith mixer produces 20 to 25 batches of concrete per hour, and operates on a 75-hp. motor. When the concrete is thoroughly mixed, the mixer is tilted to a 60 deg. angle by a Joy compressor with a 20-hp. motor. A 150-watt floodlight spotlights the


TWIN CITY READYMIX CONCRETE CO.
DAILY REPORT OF DELIVERIES

Daily report of deliveries which has been found very useful

concrete as it is dumped, so that slump can be constantly checked by both the batching operator and the office. There is a window in the floor of the batching platform, and another in the office partition overlooking the mixer room.

The mixer is checked and cleaned every night, and the blades are thoroughly scoured. For the cleaner's protection, there is only one key to the lock on the mixer switch. The cleaner puts this key in his pocket before he crawls into the mixer, so no one can throw the switch while he is inside.

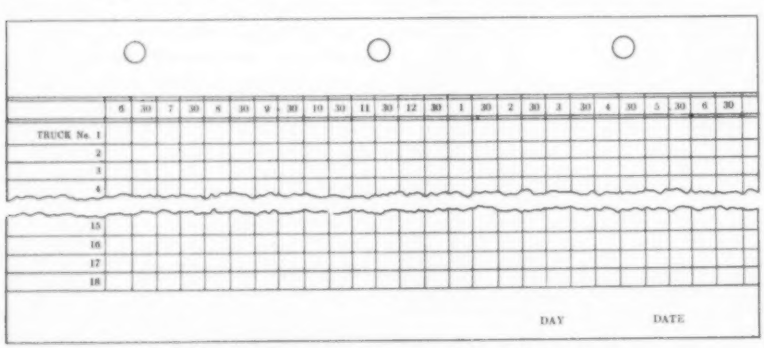
Twin City Ready Mix Concrete Co. occupies a tract half a block wide and a block long running east and west from Aldrich to Bryant avenues in south Minneapolis. On the south side, the property is bounded by a main railroad line, depressed about 30 ft. below street level. The Butler hopper has seven bins, five for aggregate with a capacity of 250 tons, and two for cement, capacity 400 bbl. each. The weigh batcher is also a Butler, originally built for 3 cu. yd., but later increased to four. The aggregate, trucked in by Minnesota Sand and Gravel Co. in St. Louis Park, five miles away, is transported to the top of the bins by a 24-in. Barber-Greene belt conveyor. Cement is brought in by rail in hopper bottom cars, and unloaded by screw conveyor to a cement elevator that takes it up to the bins.

Aggregate bins are heated in winter by a system of 3-in. steam coils. Steam is supplied by a 110-hp. Kewaunee boiler fired by an Enterprise oil burner. The instantaneous hot water heaters used for the plant have a capacity of 5000 g.p.h., and raise the water from tap temperature to 200 deg. F. Water temperature is controlled by two Powers regulator valves. With this equipment, the plant can deliver concrete in any kind of weather; in fact, more concrete is often delivered when it is 25 deg. below zero than when it is 25 deg. above.

The batching floor is equipped with a Master Materials Co. dispenser for handling pozzolith; a dispenser for adding calcium chloride in liquid form to the concrete mix; and a visible dispenser for adding Darex, an air-entraining agent. In other words, Twin City can meet any specifications that may be demanded by an architect. All strengths of concrete are produced, and all concrete is sold entirely on strength.

There is also the usual equipment for making moisture tests, and a complete set of standard screens for making sieve analyses of aggregates. The latter equipment includes a torsion balance scale so tests will be accurate. The batch operator is trained to make these tests, and the equipment is at the disposal of outside inspectors. Also available is the necessary equipment for taking slump tests and unit weights. A Watt air meter is used for determining air content. Temperature tests are made by the batch operator, the dispatcher, and on the job with Weston dial thermometers.

The new office was laid out by Mr. Lindh to save labor wherever possible and cut down steps. Without leaving his desk, he has a view of the garage, the trucks as they pull out or come into and through the yard, and the mixer, so he can check slump as the concrete is dumped. The trucks back into the mixer room to be charged.



Schedule report for mixer trucks. Time of day indicated above

Batching instructions to the scale operator are written by the dispatcher on a TelAutograph, an electrical device much used by railroads, that allows a message written by one individual to appear simultaneously in a different location in the same handwriting. The scale operator has an identical machine. When he has filled the order, he crosses it off on his own TelAutograph, which then is noted on the dispatcher's machine and finishes the cycle. There is an intercommunication system throughout the plant and office, that includes the Bryant avenue driveway and the garage on Aldrich avenue; but Mr. Lindh felt that because of the noise in the plant, something more positive was needed to prevent mistakes.

Tickets for the truck are made out in the office, and dropped through a chute beside the dispatcher's desk to the driver below. Precise directions for reaching a given job are written on the delivery ticket. Little-known streets can be speedily located on a large polyconic projection wall map of the entire area, which is rolled up out of the way when not in use, like a window shade.

Mr. Lindh has worked out two simple daily delivery forms which enable him to see at a glance exactly what each truck is doing and what he can promise in the way of deliveries for days ahead. Many ready-mix operators who have seen the forms have asked for and been given samples, so they can use them in their own operation.

On the south side of the mixer room is a room that houses the air compressor and all electrical switch boxes. At the east end is a heated storage room for calcium chloride, pozzolith, and Darex. These supplies are trucked in and dumped directly into 500-gal. tanks that are level with the truck floor, an arrangement that eliminates unnecessary handling and keeps everything under cover.

Another Twin City service is the mobile telephone which enables Mr. Lindh to keep in touch with the customer and the plant to expedite deliveries.

"In these days when telephones are hard to get on construction jobs, we're able to be of considerable service to our customers," Mr. Lindh explained. "The mobile has been particularly useful on suburban school buildings where they have to wait for a telephone for five or six weeks."

Keep Equipment Clean

Twin City Ready-Mix was founded in 1941 by L. V. Madsen, its present president. Mr. Lindh, a long-time member of the American Concrete Institute, joined the company at that time, and superintended the erection of the plant. The firm, which started with six International trucks and 2-cu. yd. Rex mixers, now has 14 trucks: four International tandem-drive with 4¼-cu. yd. Smith agitators; four In-

(Continued on page 144)

NEW MACHINERY

Dual Front Mixer Truck

CHAIN BELT CO., 4649 W. Greenfield Ave., Milwaukee 1, Wis., has developed a second front axle, the Rex-Spangler unit, to be installed in connection with the standard front axle

"Cab-over" truck equipped with two dual-steering, tandem, front axles

by two walking beams, on concrete mixer trucks. Use of the additional axle provides a chassis weight shift to allow a greater payload on the rear axle, and still meet the maximum legal payload for four-axle trucks. A tandem bogie steers the four front wheels with center poise steering, and since the load on the front axles is supported by four tires instead of two, greater traction, flotation for moving heavy loads through soft soil, and vehicle control in case of a front tire blow-out, are said to be resulting features. Tip-overs, "jack-knifing," and tire skidding are also said to be eliminated. The dual-steering, tandem front axle may provide an addition of as much as five or seven tons to the original payload.

Fork Truck

ROSS CARRIER CO., 3939 Miller St., Benton Harbor, Mich., has introduced a 6000-lb., gas-powered fork truck on pneumatic tires, the Ross Series 6, to expedite indoor-outdoor handling operations. Open tower with hoist cylinders and chains located within side members of the tower, provide unobstructed vision for the driver. Other features are the single lever hoist and tilt control; four speeds forward and four reverse for various operations; and planetary gear drive in the wheels for reducing wear on differential and drive axles.

Gas-powered fork truck with single-lever hoist and tilt control

Masonry Saw

CHAMPION MANUFACTURING CO., 2028 Washington Ave., St. Louis, Mo., has created the Tak-A-Bout, a 245-lb. portable masonry saw. Built primarily of tubular steel, it is available in a 14-in. blade model with 1½ hp. motor and a 12-in. blade model with 1 hp. motor. Both size models are available in designs for wet or dry cutting and for dry cutting only. Dry cutting models can be converted to wet cutting, by the addition of a "conversion" kit, while wet cutting models have a self-contained water system and a self-priming pump, which carries a one-year guarantee. Provision is made for accessory wheels to facilitate easy moving on a job.

Portable masonry saw

Industrial Turntables

THE CHASE FOUNDRY & MANUFACTURING CO., Columbus, Ohio, has introduced a line of power-driven industrial turntables equipped with positive self-aligning mesh gear drives. The turntable features a totally enclosed gear reduction unit; anti-friction bearings throughout; remote push-button controls for forward, stop and reverse action; and lubrication fittings of ready accessibility. A solid band of steel circles the table, eliminating the need for forms when pouring concrete around the unit during installation, requiring a 15-in. pit depth to install it flush with the floor. The units are available in diameters up to 8 ft. and have capacities of up to 10 tons. Among uses for the turntable are the handling of concrete block racks, blocks and pallets.

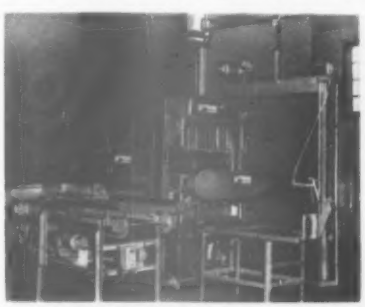
Power-driven turntable with enclosed gear reduction unit

Mobile Two-Way Radio

GENERAL ELECTRIC CO., Syracuse, N.Y., has introduced a two-way radio set, designed for use on materials-handling vehicles. The unit is intended for use in the low-power, industrial-licensing classification, and is limited to three watts of input power under F.C.C. regulations. The control panel, used with a-c and d-c power supplies, may be mounted either directly on the front of the case, or separately for convenience in a particular installation. The speaker is mounted within the case, while connections are provided for external mounting, if desired. Special mounting brackets are available for under-dash or other special installations.

Concrete Block Machine

FLEMING MANUFACTURING CO., 87 Fleming Ave., Cuba, Mo., has introduced the FMC-400 automatic concrete block machine. The hydraulically-operated machine produces between 400 and 500 standard 8- x 8- x 16-in. block per hour with one set of plain steel pallets, either 18 x 18 in. or 18 x 22 in. Solenoid valves are used for positive action of each operation, and high-speed vibration and pressure are employed to produce uniformly compacted blocks. The machine may be adapted to the moisture content of the concrete and various types of aggregates. Pallets can be received at either side of the machine by a roller-type conveyor, and a chain-driven motor actuates the off-bearer which operates by finger-tip control.



Automatic block machine produces between 400 and 500 block per hour

Market Forty Million Block Annually

Builders Supply Corp., Phoenix, Ariz., operates the largest single block plant in the United States. Economies in handling materials and finished concrete products have cut costs to a minimum

By WALTER B. LENHART

Overall view of block plant with research laboratory in the foreground

"WHERE IS THE LARGEST CONCRETE BLOCK PLANT in the United States that is all under one roof?", is a question frequently asked. One might expect the answer to be such large metropolitan areas as New York City, Chicago, Los Angeles, or Philadelphia. Surely it must be east of the Mississippi river, or as a second guess in one of the West Coast cities. No, little old Phoenix, Ariz., wears the crown, and the company is the Builders Supply Corp. In this southwestern city that sprung from the desert's dust all within the last few decades, six Bessers are operating 24 hours per day making 120,000 units per day and it all started only nine years ago on cash assets of $3500. If one wants an example of the free enterprise system in action, Phoenix and the Builders Supply Corp. have it. This company was founded by Bill Thomas, Paul (Coach) Thomas, and Gilbert E. Olson.

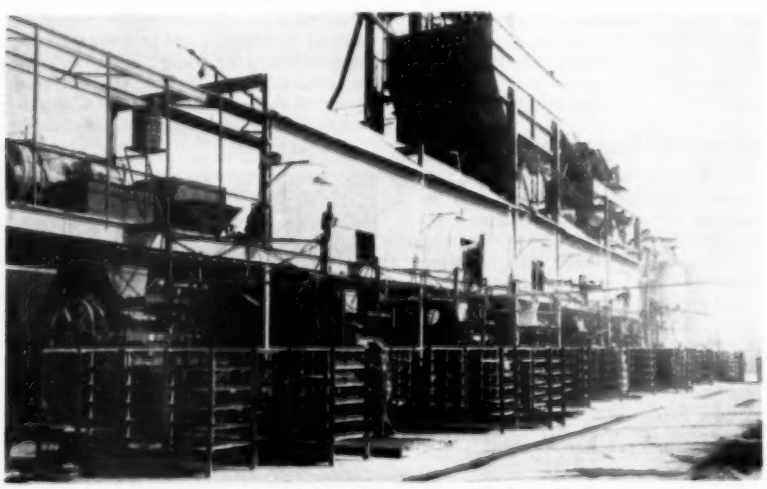
Phoenix is one of those all-the-year-round cities. It owes its existance to the dams on the Salt river. There are several of these dams that supply water for irrigation. Roosevelt dam is the better known. It is of concrete construction. Large areas of farm land are also irrigated by deep well pumps.

Plant Economies

The Builders Supply Corp. has faith in the future of the Southwest and recently added a sixth Besser Vibrapac to the production line. To market successfully from 35,000,000 to 40,000,000 concrete masonry units per year in a city that has a population of 107,000 there must be a reason, or several of them. Obviously, the masonry products must be of high quality and that quality must be maintained. Aggressive salesmanship is essential. And the third factor is a progressive lowering of operating costs. If one mill per unit can be saved on a production schedule of 40,000,000 units per year, a saving of $40,000 can be obtained.

An illustration of production planning is the newly inaugurated practice of "doubling up." It is very simple. Wherever possible, instead of handling one rack per lift truck, the truck handles two. Instead of two racks in front of a machine there are four. Each unit of the Yale lift truck fleet has had the front section worked over so that a truck carries two racks of green blocks into a kiln and comes out with two racks of cured units. Similarly, instead of loading one cube to a flat rack truck, two cubes are set in place. This all adds up to less man-power, fewer lift trucks to buy in the first place, and fewer lift trucks to maintain. The Yale lift trucks also have been equipped with special pick-up devices so that cans of broken block can be handled economically.

Another illustration is in the reclaiming of hot water that is essentially condensation from the 21 steam curing kilns. The kilns are 12- x 15- x 75-ft. The kilns, open at one end only, are arranged in a single row with live steam jets near the center of the kiln, ejecting live steam both ways. High line pressure steam is used at 130 to 150 p.s.i. The temperatures in the kiln are in the 180 to 190 deg. F. range, and are maintained at atmospheric pressure. A 12-hr. steam curing cycle is used with yard storage for a minimum of 30 days. From 4,000,000 to 6,000,000 units are in the yard at all times. There are three 150-hp. boilers using natural gas with fully automatic equipment. Steam is turned on at 10 p.m. Sundays and is off Saturday noon. The equivalent of 600-hp. of gas is burned at 70 to 80 percent efficiency. There is one Dixon Scotch marine boiler, a Titusville locomotive style unit, and a newer type of Titusville steam plant. Boilers are periodically inspected by Hartford. With this capacity, a considerable volume of condensed steam could go to waste but not at Builders Supply Corp. The warm water is sent back to the mixers and is blended with fresh water so that a more rapid curing of the block results at a considerable saving in operating costs.



Showing battery of six high-production block machines

Truck Unloader

However, the most outstanding single development of Builders Supply Corp. was to build and use a

Left: Unloader ready for action. Bridle is in place and driver has set up hinged section to the rear. Hydraulic lift will raise two cubes of block and gas engine will propel load out to the rear end of extension. Center: Showing gas engine and lifting mechanism to the rear with extension rails folded up. Right: Truck driver lowering two cubes to the ground

truck unloader that really works. The unloading unit weighs only 1480 lb. net. It costs less than $2000. It can be rapidly lifted on and off of a flat rack with a fork truck, and will leave the flat rack truck body free and clean for any other use. The danger of breaking masonry units due to the unloader is no greater than the danger of a breakage due to loading a cube of block onto the truck by conventional methods, and less breakage than hand loading, or hand unloading. It will lift as high as 9000 lb. and will handle 6000 to 7250-lb. loads as a normal function. With two cubes per lift of Superlite blocks 180 units are easily handled. With heavier blocks, two 75 unit cubes, or 150 block is a conventional load.

The system entails two sections; the first is the installation of two parallel rails to a flat rack deck, one on each long edge of the truck bed. They are 92-in. long, running the length of the body. In addition, on the tail end of the bed is a folding extension about 5 ft. long. Thus the rail section, when in use, is about 5 ft. longer than the truck bed itself. The outboard end of this folded section can be supported by a steel vertical member when in use. When the truck is on road it is also folded out of the way.

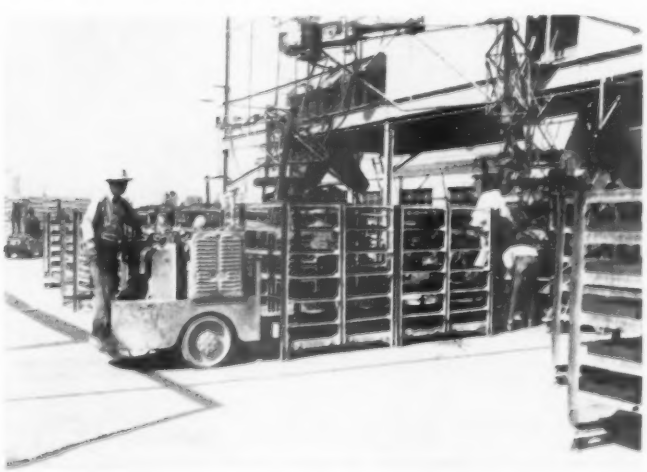
The second section is the lifting unit itself. It is 8 ft. wide and rides the two parallel rails. It is a light structural steel frame on which is mounted a 7½-hp. Briggs & Stratton air-cooled gasoline engine. This engine operates an hydraulic (oil) motor with two pumps. Hydraulic cylinders do the lifting. The gasoline engine, through roller chain drives, propels the carriage for the unloading operation.

In operation, lift bars (1¼-in. steel pipe) are passed through the cores of the bottom row of blocks. A bridle, plus the hydraulic lift raises the two cubes gently an inch or more above the deck of the truck. The truck driver next throws a lever and the gasoline engine propels the load of two cubes which are slowly moved back onto the hinged rail section. The two cubes are then lowered to the ground. The lift bars are pulled out and inserted in the next cubes to be unloaded and the truck moves ahead about 6 ft. to give clearance for the next stack.

The Builders Supply Corp. has seven of these unloaders on its own trucks and there are 11 in the city of Phoenix. A load of 1080 blocks (12 cubes of standard 8's) can be unloaded by the truck driver unassisted in about 20 min. The Builders Supply Co. has set up a separate company to manufacture and sell the

To the right: Block machine operator has a wooden platform on which to stand. Note two racks on each side of operator. This is the new installation over which extension of main building has not yet been completed

Below: Lift platform truck handles two empty or two loaded racks at a time. This is part of the "doubling up" plan of the company



One of the tractor-trailer units hauling block. Note that trucks are painted different colors on each side. Art Gumper is shown in the foreground

unloaders. This company is named the Builders Equipment Co. and the unloader has been named the "Superlite Unloader." Superlite is the trade name of all concrete masonry units made by the Builders Supply Corp. A. J. Gumper, formerly with the Niles Mfg. Co., Jackson, Mich., is the sales manager of the Builders Equipment Co.

The company also has added a Kent Lintellator to make precast lintels and sills.

The Builders Supply Corp. has found that by the use of the Superlite unloader a higher caliber truck driver can be kept on the job and he is better satisfied. He also takes much better care of his equipment. He is proud to belong to the "Rainbow Fleet" operated by Builders Supply Corp. The name "Rainbow Fleet" stems from the company's practice of painting all mobile equipment two colors. One half of each unit is painted a flaming yellow. The other half runs the color spectrum and ranges from blue, brown, green, etc. One novel feature is that the color split is on a longitudinal basis so if one is on a certain side of the street as the truck delivers a load he may see only a bright yellow truck. On the return trip he may see a brown truck. Local people thus get the impression that Builders Supply Corp. have twice as many pieces of mobile equipment as they really have. Needless to say the trucks are kept clean and bright and all this adds up to good publicity and better public relations. The Rainbow Fleet recently received a citation for safety. Truck shipments go out from Phoenix to San Diego and other California points and return with a pay-load of oil and other items.

Two of the silos for storage of pumice and scoria aggregate. Each silo holds 11 carloads

Use Volcanic Aggregates

The concrete masonry blocks manufactured at Phoenix are made with a blend of volcanic clinker (scoria) and pumice aggregates. Both materials come from company-owned and operated deposits. Eleven carloads of this material is unloaded and processed at the Phoenix plant each day, and the Santa Fe railroad has assigned 66 open-top, bottom dump cars to this service exclusively. The pumice is shipped from Williams, Ariz., and this pit has been in operation for several years. The scoria pit has been in operation about eight months, and it is located near Ash Fork, Ariz. Williams, Ariz., is about 180 miles north of Phoenix and Ash Fork about 165 miles to the north. The scoria at Williams is given a preliminary crushing at the mine before loading. No processing at the pit is done on the pumice.

The cars arriving at Phoenix unload to a track hopper and the crude material (minus 6 to 12 in.) is crushed in a 16- x 36-in. Denver Equipment Co. jaw crusher to about 1 in. This material can go in either of two directions via belt conveyors. It can go to two steel silos each holding 11 car loads. One silo is for scoria and the other for pumice, or, the material can go to a Symons vibrating screen that operates in closed circuit with a set of 36- x 18-in. and 14 x 24-in. rolls; all minus ⅜ in. is sent to silos ahead of the weigh batchers. There are four of these silos, each of 12-car capacity. The cement silo holds three carloads with cement from the Riverside Cement Co. The content of the blocks varies, but 60 percent pumice and 40 percent scoria is nominal. The minus 1-in. material in the silos can be drawn to a reclaiming belt via two Jeffrey electric vibrating feeders and, if desired, a blend can be made on the belt. Normal car unloading, however, is arranged so that three operations can be conducted at the same time; i.e., filling storage silos (minus 1 in.), unloading storage silos, and sending minus ⅜ in. to the finish silos. There is some outside storage area available over the reclaiming tunnel for the minus 1-in. materials. A travelling dolly delivers material from the weigh batchers to each 50-cu. ft. Besser mixer over the Vibrapacs.

Repair facilities at Phoenix are quite extensive and include a large

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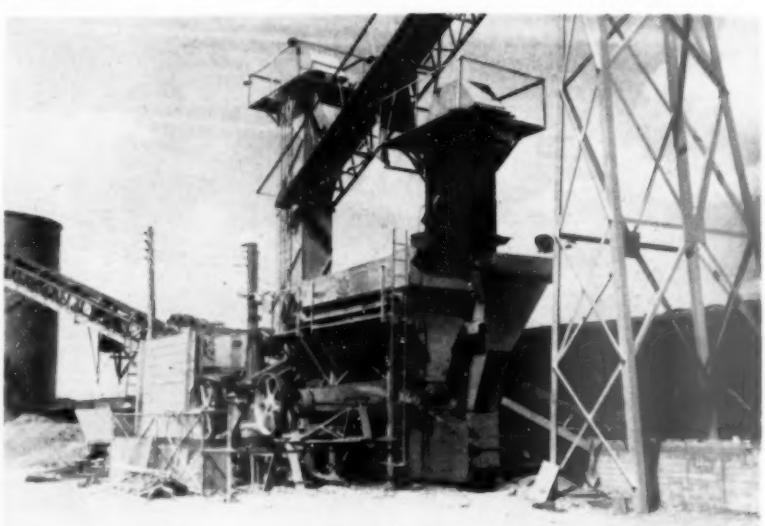


Compact screening and crushing plant for the preparation of scoria and pumice

10. A producer views the ready-mixed concrete business . . . .

CUSTOMER RELATIONS

By JAMES A. NICHOLSON*

Today, adequate servicing of construction jobs is still the major problem of the ready-mixed concrete industry. The sales policy of every ready-mixed concrete operator should be based on a sincere effort to supply to the contractor the kind of concrete he wants, at the time he wants it.

● FROM THE 1941 MANUAL of the National Ready Mixed Concrete Association:

"Don't overlook the capacity of your facilities. Make intelligent delivery promises and then keep these promises. Carefully plan delivery schedule in advance. Win the cooperation of your customers. This will mean lower cost to you and a more profitable purchase for him."

THE BASIS OF SUCCESS in the ready-mixed concrete business is *service*. We prosper only when the concrete contractor makes money handling concrete. His profits largely depend on our service.

Historically, processing concrete was part of the operations of the building contractor. Arranging for deliveries of aggregates and cement so that necessary material would be on hand before jobs began was not a difficult assignment for the contractor. In job mixing of concrete, his prime difficulty came in moving the concrete from the mixer to the many different points of placing. Shovels, wheelbarrows, buggies and chutes had to be provided. Approaches had to be planked, ramps had to be built and a host of other improvisions were the contractor's lot on every job. In the job mixing of concrete there was almost a complete absence of control—the processing of consistent quality concrete was virtually an impossibility. With unionization of the building trades industry, job labor costs climbed skyward.

To circumvent those difficulties, attempts were made to process the concrete at central mixing plants and make deliveries in dump trucks. Had the principles of air entrainment been understood at that time, this method of handling concrete might have become the future pattern. Shortly, the truck mixer entered the picture and quickly ready-mixed concrete became an established building product.

The concrete truck had and has its greatest appeal in its ability to move about on the job—to deliver concrete here or to place it there—to chute the concrete directly into forms, to discharge into buggies, wheelbarrows, field hoppers, buckets or conveyors at points close to the involved work. It has been well said that ready mixed concrete brought convenience to the building industry.

Counteracting somewhat the benefits produced by the convenience of moving the concrete truck around on the construction job, has been the inability of the average ready-mixed concrete operator to process concrete of consistent overall quality and arrange his deliveries so that the contractor gets his concrete when he wants it. On servicing jobs, there have been too many failures to get the truck to the site on time, coupled with inability to properly space deliveries so that construction operations proceed efficiently.

By setting up and carrying out sound service, quality and pricing policies, the alert ready-mixed concrete operator is constantly striving to improve his customer relations.

How to Have, Hold and Gain Good Customers

A good customer is a real, most important asset. If you repeatedly net $1000 yearly, through handling one customer's business, how much is that single relationship worth? This intangible asset doesn't appear on your balance sheet. However, the vital importance of such relationships should always be imprinted on your mind and heart.

Even to the smallest customer, sincere courteous service always pays big dividends. A "pickup in a container" customer actually became one of our best salesmen. Using an ash container, a man picked up concrete for two post holes. We charged him $1.00. Of our certain knowledge, that man has since been responsible for sales of more than 200 cu. yd. of concrete to other customers.

Success or failure in developing good customer relations is largely in the hands of employes—the order taker, the dispatch clerk, the credit manager, mixer operators, truck drivers, salesmen and service supervisors. All play their important roles.

Stress employe cooperation. Seek in every way to eliminate all possibility of friction in employe relations with customers. A dependable ready-mixed concrete operator always enjoys the business of many good customers. Generally, a contractor becomes a good customer because it pays him to be such. Proof of dependability always increases the number of good customers possessed by an operator. The on-time delivery of a reasonably priced quality concrete assures the development of good customer relations.

In the ready-mixed concrete industry, serving is more important than selling. The best salesman cannot overcome the obstacle of poor service; but on the other hand, dependability of service practically solves the selling problem. Among our most valued customers is a leading contractor, reputedly the toughest buyer in town. During the past five years or more, there has been no bickering with him over prices. However, all employes in our organization know that this man is to get top service. He gets concrete as he wants it, when he wants it.

Your present customers should be your No. 1 concern. Don't reach for your competitors' contractors at the expense of failing to properly serve your own customers. Establish a reputation for giving service to your customers and other contractors will want you to serve them.

New Customers

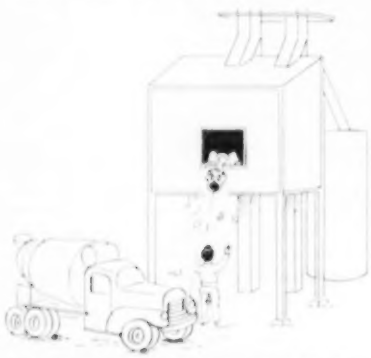
An operator should make every effort to meet the new customer. The development of good relations should start with the first order. The handling of that first order may create impressions that will last through the years. When favorable first impressions are made, then followed up with continued good service, competition may never get a chance. On our list of good customers, there are many concrete contractors who used our concrete on their first jobs. Some of them have never bought concrete from any other supplier.

The new customer may be an established contractor. He may be a rookie breaking into the business. In either case, first impressions are important. See to it that the first order is efficiently handled and that follow-up contact is promptly made. If the new customer is an old contractor, either call him, visit his office, or preferably go to the job while the concrete is being placed. The receipt of his check in payment of the account gives you another opportunity to thank him for the confidence he has placed in your company.

The young man or men just getting

*Pres., Nicholson Concrete Co., Toledo, Ohio

started provide a real field for good customer relations. After the credit manager has completed necessary arrangements, you should visit with the new contractor. The opportunities in his chosen work should be carefully pointed out. The problems he must face, should be fully discussed. Tell



Fueding between batcher operator and mixer truck drivers must be discouraged

him that your service man will visit his jobs to check the quality of the concrete, to discuss job problems, and to be of any possible assistance.

Stress these points:

1. *The new contractor must be able to do quality work.* Assure him that upon proof of dependability you will help him get started by lining up some work that you feel he can handle.

2. *He must make a profit on the work he undertakes.* Offer to assist him in straightening out his cost figures.

3. *He must get prompt payment for his work.* Convince him that you expect to be paid promptly, and urge him to call you for credit reports on any new accounts he might be considering.

Your service men should report back on how the new contractor is developing. Drivers, delivering on his work, should be questioned about his efficiency. Contractors or owners, for whom he is working should be called on, or otherwise contacted about his progress, and in every possible way efforts should be made to help the new customer get off on the right foot.

Complaints

Drop everything to handle a complaint. Next to service the prompt satisfactory handling of complaints makes the greatest impression on your customers.

Handle promptly all complaints on service, quality of the concrete, job failures, credit relations, employes' performance and the many other items that tend to disrupt pleasant dealings with your customers.

On busy days you will undoubtedly get service complaints from private individuals or other irregular customers; on peak days you may get such complaints from some of your regular customers. However, there should be an absence of complaints from your preferred contractors. If the latter group is constantly protesting on service, this part of your operations needs prompt, effective attention.

Protests involving quality of the concrete, come from the contractor when the loads do not run consistently uniform, concrete is either too dry or too sloppy, contractor experiences difficulty in placing or finishing the concrete, and when in its hardened condition concrete cracks, crazes, dusts, flakes off, honeycombs, or in any other manner fails to measure up to reasonable expectations.

Through the testing laboratory you hear from the architect and owner when your concrete fails to meet specifications on compressive strength and other requirements.

In effect, on your future success a complaint is more important than a sale. It is safer to delay a day in seeing a customer about a new job than it is to delay an hour in following up a complaint over the concrete. The handling of a complaint requires prompt, effective attention. This is no time for pussy footing or dodging responsibilities. It is a time for action. Here is an occasion where it always pays to lean over backward in being fair with a customer. If there is any question that some of the responsibility is yours, you should share the expense with the contractor. If the evidence is clear that your concrete was at fault, you should bear the costs in full.

At our operations, unless we are able to convince the contractor he is solely responsible for what damages have occurred, it is our policy to share in his extra costs. It is a policy that has paid its way. At low annual cost it has helped greatly with customer relations.

Dusting resulting generally from inadequate curing, has been our main problem on which we have shared the expense. The application of a hardener has economically corrected 95 percent of the dusting floors that we have encountered.

On one class of complaints—frost action cases—there is an exception to our policy. When we are convinced that frost has disintegrated the concrete surface, we come supplied with ammunition. Delivery tickets have been pulled out and weather reports carefully studied. On this type of complaint, we have not made a single adjustment. The evidence is always overwhelming that the contractor had failed to afford proper protection to his concrete.

The complaint based on the findings of a testing laboratory is a tougher problem. An operator who fails to properly process his concrete to meet the exacting demands of a job specification is a fool. Yet, in spite of your certainty that you have lived up to every requirement, your concrete can be rejected, even thrown out. It has happened to us and to others.

Recently, on a big job involving an out-of-town architect, a testing laboratory, having designed and tested the concrete, submitted two reports showing results several hundred pounds below required (3750 p.s.i.) 28-day strengths. There was a question as to mix design and testing procedures. Concrete was ordered to be torn out. We had the rejected concrete, which had been torn out, core tested by an independent laboratory. The test results showed full and complete compliance with the specifications. This evidence was refused any consideration. Somewhere in our contractural or specification regulations, there should be fair remedial provisions for such a situation.

Several years ago we received a complaint covering two large projects that some of our concrete had crazed. I visited the work within an hour. During the next two days we had three concrete engineers study the problem. The owners and the contractor engaged the services of a testing laboratory to make strength cylinders and to check surface conditions. The opinions of our investigators were confirmed by the findings of the laboratory. The contractor sent the following letter to one of the owners:

October, 1950

Re:
Plant Addition, Toledo, Ohio

To owner

Gentlemen:

We are attaching hereto, two copies of test reports submitted by the Testing Laboratory showing the results of their load test on cores drilled from your pavements. From these reports we would say that you can assume that the concrete in these pavements is good because with one exception, all of the tests show concrete exceeding 3300 p.s.i. We are inclined to believe that the load test on this one exception indicates damage to the core rather than poor concrete.

You will note that Mr. —— states that there is slightly more mortar on the surface than is desirable. Our own inspections tend to confirm this judgment. We believe that the reason for the crazing of the surface was the fact that these pavements were finished with a power float and there was probably a little too much floating which brought too much of the cement paste to the surface. In the future, we would suggest that exterior pavements be floated the minimum possible to give a decent surface without steel trowelling.

We will be glad to have your comment on this.

Yours very truly,
CONSTRUCTION COMPANY

Here, as in many cases, the lodging of a complaint offered the opportunity to effect a situation whereby customer relations could be definitely improved. There can be no excuse for a failure to promptly and efficiently follow up a complaint.

The prompt fair treatment of justifiable complaints will do much to promote good will.

One of your better approaches to a contractor is through the construc-

tion man in the field. The job superintendent, the concrete foreman, cement finishers, and laborers can play important roles in helping to sell you and your product to their boss. To have these men in your corner, you've got to know them. To know them, you've got to go out to the jobs. When they regularly call you by your first name, you've begun to get results.

Use well your time on job visits! Talk the men's language. Get them interested in your problems. Welcome their suggestions on how you can improve your service and your concrete. Take slump, air and strength tests of the concrete they are placing. Get motion or slide pictures of their work. See to it that individuals get copies of pictures in which they appear. Drop off a slide rule, a cigar or some other small token. When complaints come your way, a friendly guy on the job can help you over tough hurdles.

How to Lose Customers

In business, customers are generally lost because they have been alienated by the supplier's selling, service or credit policies. In ready mixed concrete operations, the loss of good customers is primarily due to continued poor service.

The average customer who is satisfied with your service will give you the opportunity to meet the better price he has been quoted by your competitor. In a contractor's overall costs, slight savings in the concrete selling price are unimportant when compared with top service. You can be sure that the man who leaves you for a lower price from the plant down the street, has quit you on the hope and expectation of better service.

Even when a customer is enjoying efficient delivery of quality concrete he can be miffed by actions of your employes—billing him twice for the same concrete, sending him invoices which should have been billed to other contractors, billing at higher than

Ready-mixed concrete operators should follow up jobs by personal contacts with contractors

agreed price, insisting upon waiting time charges when poor service had been given on previous deliveries, improper handling by the order taker, false promises by the dispatch clerk, sending dunning letters after the accounts had been paid and the preparation of collection letters, tactlessly written.

The contractor also will be unhappy if, through carelessness, ordered expansion joint material or reinforced wire fails to arrive before or with the concrete delivery. He will be displeased if the wrong concrete or

It is more important to give immediate attention to complaints by a telephone or personal call than it is to get a new order

the incorrect amount is being constantly sent out, and if the trucks are frequently being sent to wrong addresses.

In our industry, employe attitudes can be decisive in losing customers—this can be true with the order taker, dispatch clerk, mixer operator and the drivers. We are in a service business and customer demands generally are urgent. Under the pressure, many employes associate "customers" with "trouble."

The best way to get employe cooperation in customer relations is to explain your problems to them. Show them how their own jobs tie into the picture. We have seen cases where a mixer operator deliberately sent a wrong load out with a driver just to get even with the latter. No right thinking employe would do such a thing—so much is granted. However, operators might be surprised to learn how many times customers have been irritated by employe feuds carried out to the delivery end where supervision, at best, is most difficult.

The fastest way to lose customers is to never check up on your faults—to know that there are many weaknesses in your method of handling customers and then not do anything to correct them.

In a properly operated ready-mixed concrete company, a key employe regularly audits the organization for customer relation purposes. He explains the firm's policy to the employes, he spot checks to determine weak points, he devises procedures and routines to overcome discovered weaknesses. He sees to it that proper customer relations are given top consideration.

Largest Block Plant

(Continued from page 138)

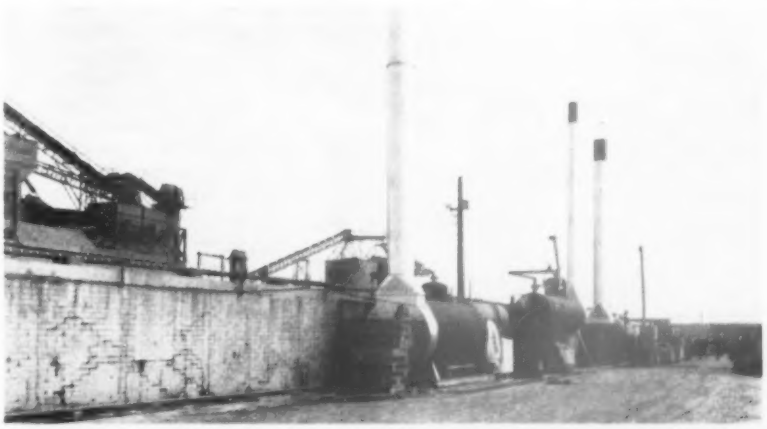
stock of spare parts. Engines are completely overhauled with several extra on hand so that in case of a failure a quick substitution can be made.

Pumice Plant

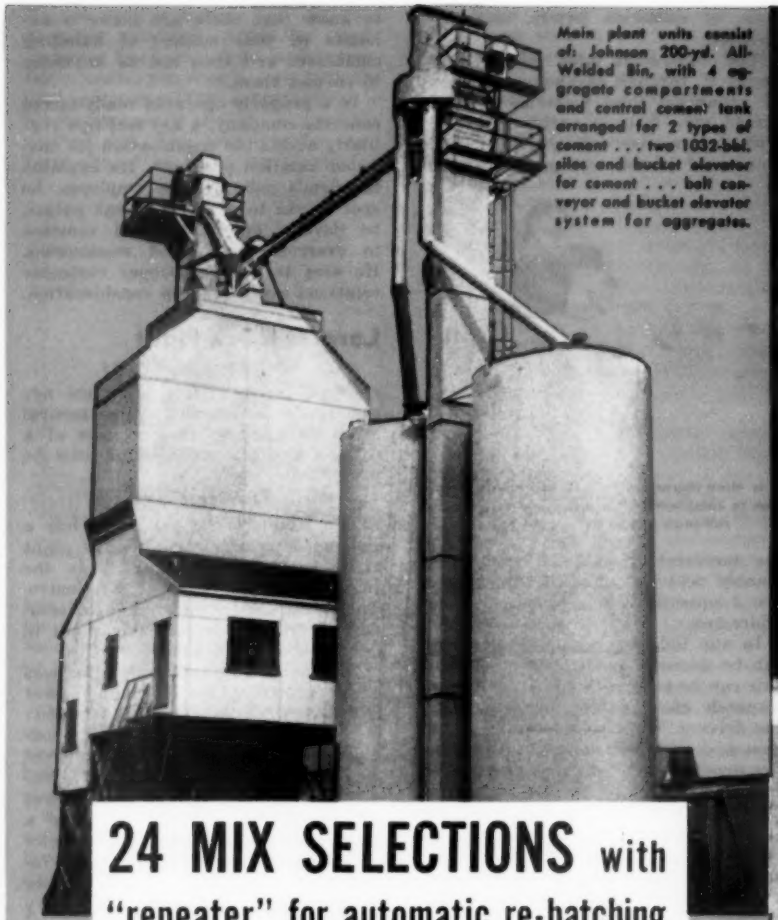
The Builders Supply Corp. has a very modern concrete masonry plant at Calipatria, Calif. This is in the Imperial Valley north of El Centro. This plant uses pumice from the company-operated pumice sizing plant in the same general area.

Originally the pumice operation was a dry crushing and screening plant but early this year (January 1953) it was changed over to a wet screening operation making it possibly the only wet pumice treating plant in the world. Changing over to a wet plant stemmed from a desire to make a cleaner product for the raw pumice contained some clay articles. The removal of the clay from the pumice is by the use of Western Machinery Co. attrition machines. These machines are a relatively new addition to the rock products processing equipment and were first described in ROCK PRODUCTS, February, 1952, page 100, where the attrition machines were used to clean clay and mineral coatings from silica glass sand. The attrition machine is essentially a vertical shaft to which are afixed wear-resistant paddles. The shaft operates in an octagonal tank. The de-

(Continued on page 146)



Battery of three large high-pressure boilers provide steam at Builders Supply Corp. block plant. The 21 kilns are open at one end

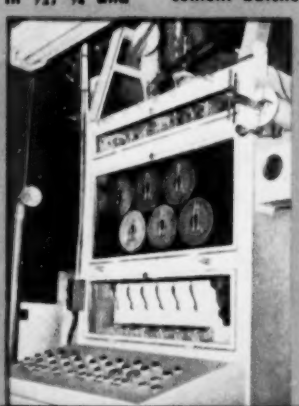


Main plant units consist of: Johnson 200-yd. All-Welded Bin, with 4 aggregate compartments and central cement tank arranged for 2 types of cement . . . two 1032-bbl. silos and bucket elevator for cement . . . belt conveyor and bucket elevator system for aggregates.

24 MIX SELECTIONS with "repeater" for automatic re-batching

Fully automatic and completely flexible, this Johnson Transit-Mix Plant produces 24 different size and type batches of aggregates and cement for a commercial ready-mix company at Covington, Ky.

Dial on a 24-mix-selector panel (below) provides for 2500-lb., or 3000-lb.-per-sq.-in. concrete in ½, ¾ and 1-yard batches. On each size batch there are 4 individual selections for 3, 4, 5 or 6-in. slumps. This makes it easy to change from one type of batch to another as needed. A "repeater" provides for continued automatic batching of any one selection for a pre-determined number of times. Operator sets the mix selector, sets the "repeater", pushes the "start" button . . . and the plant weighs out batches fast, accurately.



Plant is equipped with a 2500-lb. sand batcher . . . three 2500-lb. batchers for fine, medium and coarse aggregates . . . a 2000-lb. water weigh batcher . . . and a 2000-lb. cement batcher with dual fill valves for selecting 2 types of cement. All are fully automatic, and controlled by the Central Dial Scale Unit with pen recording of the weight of each single-material batch. Recorder shows "full" and "empty" weight of hopper, makes sure a complete batch is weighed out on each material. For all the facts see Johnson distributor . . . or write.

X9

C. S. JOHNSON CO. CHAMPAIGN, ILLINOIS

Koehring Subsidiary

9%

GRAVITY DUMP never balks . . . never wears out. You get the same one-second dumping every time . . . under heaviest loads, and in all temperature extremes. There are no hoist maintenance delays, no costly hoist replacement parts to eat into profits when you use gravity-dump Dumptors.

MORE OUTPUT

. . . with ONE-SECOND gravity dump

In just one second, Koehring heavy-duty Dumptor dumps its 6-yard load. Operator trips the body-release lever, and gravity tilts the scoop-shaped body 70°. One second later the load is out, and Dumptor is on its way back for the next load.

Because there's no waiting for slow-acting body hoists, Dumptor saves 15 to 25 seconds on every dump. This earns an important increase in extra yardage output. For example, take a typical 1,000-foot haul where an ordinary dump truck is making 16 trips an hour. Even if Dumptor took the same time to load, haul and return, it would average 17½ trips per hour on the same cycle. That's because Dumptor's one-second dumping advantage saves an average of 20 seconds on each trip . . . gains a total of 5.3 minutes more productive haul-time per hour. This, alone, adds 9% more yardage to your average hourly production.

What's more . . . by eliminating only 2 turns each trip, Dumptor no-turn shuttle-hauling adds another 10% increase in yards per hour. You'll find Dumptor® well worth looking into. See your Koehring distributor soon.

CK338

KOEHRING COMPANY KOEHRING HEAVY DUTY

MILWAUKEE 16, WISCONSIN
(Subsidiaries: KWIK-MIX • PARSONS • JOHNSON)

TOWMOTORS IN ACTION IN U. S. INDUSTRY

Loading prefab metal sections at Bargar Metal Fabricating Company, Cleveland.

Low-Down on the Load-Up

It used to take three men five hours to load one trailer. Now, three men and a TOWMOTOR load FIVE in the time it took for one!

TOWMOTOR has *everything*—TowmoTorque, the new drive that saves shifting time and energy! Creep-Control, so you can ease in and up with loads simultaneously! Exclusive TOWMOTOR Power Steering, to save wear and tear! New "Cushioned Power" Diesels for greater power and economy! When you consider original investment plus cost of operation and maintenance, TOWMOTOR handles more tons per dollar. Write today for book on TowmoTorque and Power Steering. TOWMOTOR CORPORATION, Div. 4907, 1226 E. 152nd Street, Cleveland 10, Ohio.

TOWMOTOR
THE ONE-MAN-GANG

FORK LIFT TRUCKS and TRACTORS
SINCE 1919

TOWMOTOR ENGINEERED FOR QUALITY PERFORMANCE

Rebuild Plant

(Continued from page 134)

ternational tandem-drive with 4¼-cu. yd. Rex agitators; and six International single-axle units with 3-cu. yd. agitators.

Each truck is equipped with a hose connected to the water tank so the driver can wash off the chute after each delivery. In summer, trucks are washed every day. Each morning the rear of the truck is sprayed with a mixture of 50:50 kerosene and paraffine oil, developed by Mr. Lindh after many experiments. It is very effective in keeping concrete from sticking to the equipment. Twin City has a reputation for having the finest looking trucks on the street. All maintenance work and painting are done in the firm's own garage on the property. One man takes care of greasing the trucks on a rotating nightly schedule, and checks batteries and tires.

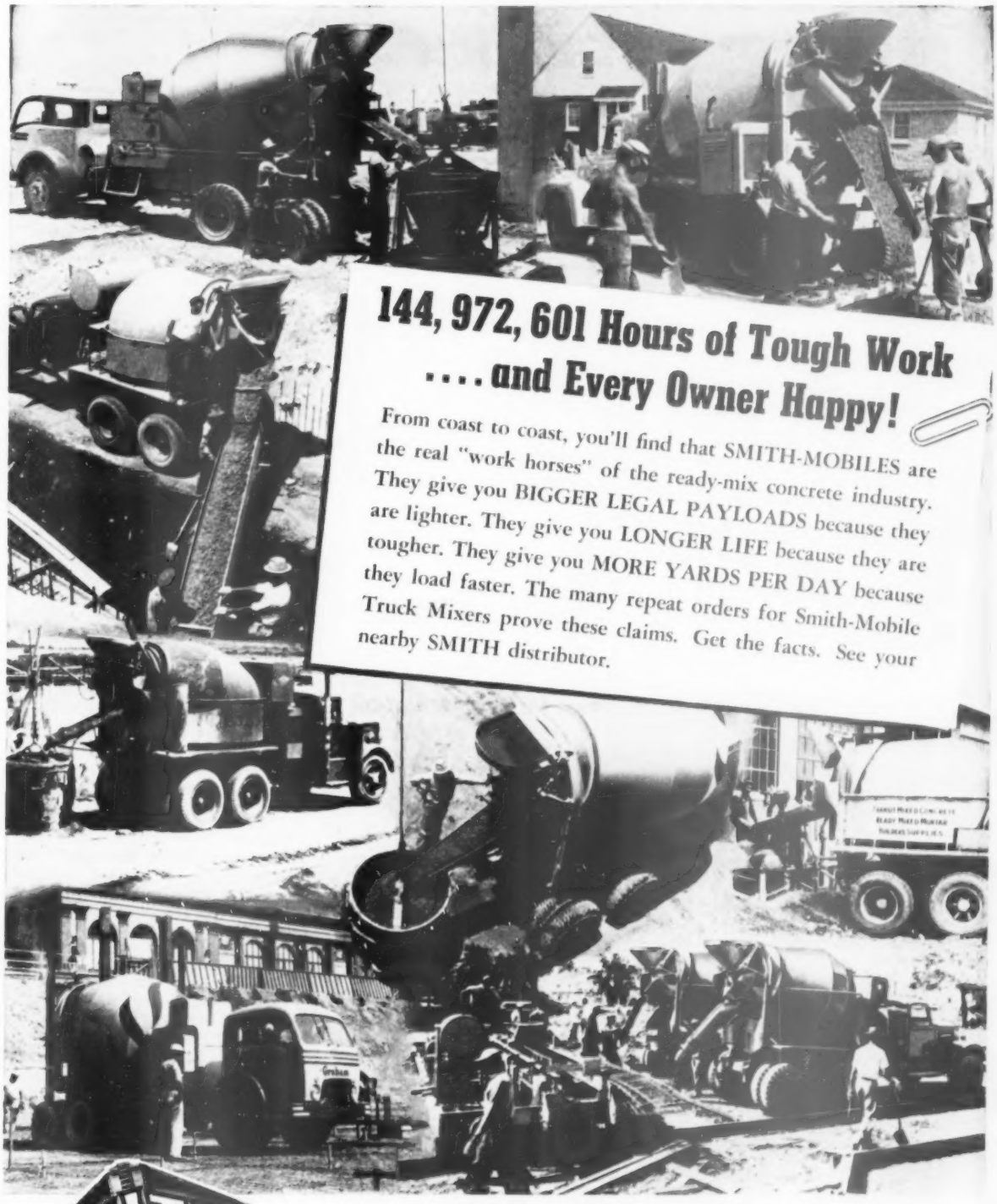
Twin City is a pioneer in the air-entrainment field, and as early as 1948 poured over 4000 cu. yd. of air-entrained concrete for sidewalks, driveways, and paving. In 1949, this record was improved by 50 percent, when over 6000 cu. yd. were poured. From 3½ to 4½ percent air is entrained, the recommended amount for getting maximum resistance to freezing and thawing while retaining strength. In operating street cars during the long and severe Minnesota winters, the Twin City Rapid Transit Co. finds it necessary to use a great deal of salt to keep switches open. As a result, sidewalks and pavement suffer which is one reason why air-entrained concrete has been so widely used in this area. Mr. Lindh is an authority on air-entrained concrete, and was recently a guest speaker at the University of Minnesota.

Patents Brick-Laying Machine

G. R. SEARL, Patterson, Calif., concrete brick manufacturer, has been granted a patent for a brick-laying machine which is said to be capable of laying 400 brick per hour. The machine, designed to lay either solid or hollow concrete block, brick or tile, consists of a pair of carriage tracks or rollers which are set on a row of brick. The rails, made in 10-in. lengths, can be telescoped out to the length of the wall. A "saddle" holds the rails in position and controls both the horizontal and perpendicular leveling. Mortar is dispensed through a hopper atop the carriage track and smoothed into place by rollers. The hopper carriage is moved manually along the rails by the operator. Walls laid with the machine are said to be stronger and straighter.

•

TRANSIT MIX CONCRETE CO. has been established at North Platte, Neb., by Russel Van Cleave, Denver, Colo., and Glen Kersting, Santa Monica, Calif.



144, 972, 601 Hours of Tough Work .... and Every Owner Happy!

From coast to coast, you'll find that SMITH-MOBILES are the real "work horses" of the ready-mix concrete industry. They give you BIGGER LEGAL PAYLOADS because they are lighter. They give you LONGER LIFE because they are tougher. They give you MORE YARDS PER DAY because they load faster. The many repeat orders for Smith-Mobile Truck Mixers prove these claims. Get the facts. See your nearby SMITH distributor.

SMITH
THE T. L. SMITH CO. MILWAUKEE U.S.A.

THE T. L. SMITH COMPANY
2885 North 32nd Street • Milwaukee 45, Wisconsin, U. S. A.
Affiliated with ESSICK MANUFACTURING CO., Los Angeles, Calif.

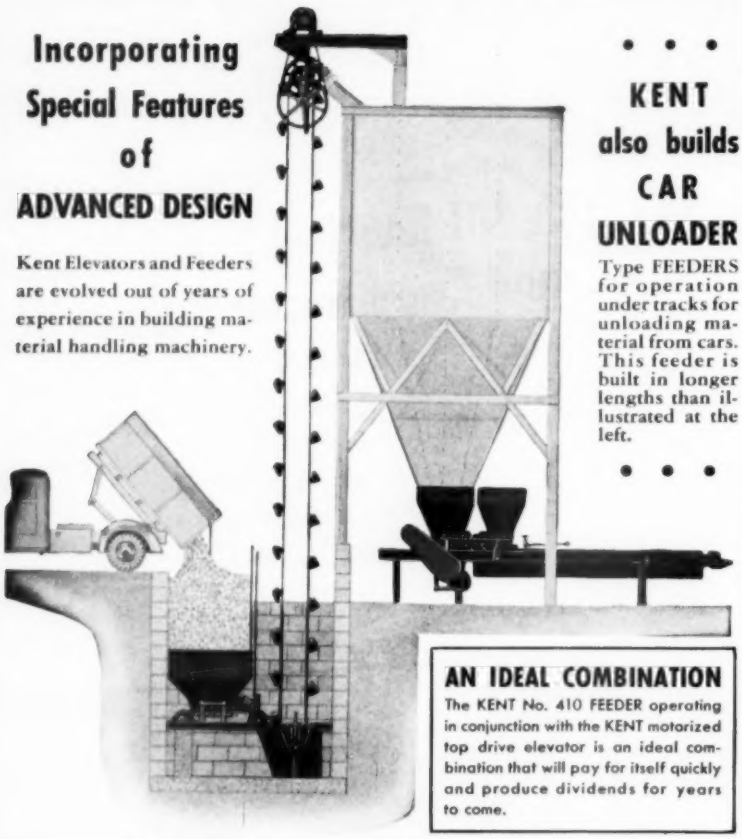
CONCRETE MIXERS

For BIGGER and BETTER Concrete Mixers and Truck Mixers . . . LOOK TO SMITH

KENT FEEDERS & ELEVATORS

Incorporating Special Features of ADVANCED DESIGN

Kent Elevators and Feeders are evolved out of years of experience in building material handling machinery.



• • •

KENT also builds CAR UNLOADER

Type FEEDERS for operation under tracks for unloading material from cars. This feeder is built in longer lengths than illustrated at the left.

• • •

AN IDEAL COMBINATION

The KENT No. 410 FEEDER operating in conjunction with the KENT motorized top drive elevator is an ideal combination that will pay for itself quickly and produce dividends for years to come.

No. 410
ADVANCED MODEL FEEDER

For handling sand, crushed stone, aggregate, etc. from hopper or Gondola Car.

It is driven steadily and smoothly by the elevator motor through the elevator belt. Material is continuously fed into boot by long-life rubber belt — pressure, grease lubricated anti-friction bearings — rollers support belt at intervals.

Adjustable hopper gate governs volume of material fed into elevator boot.

No. 139
KENT MOTORIZED ELEVATOR

Constructed entirely of high grade approved materials. All metal except belts.

Unit drive is by electric motor through V-belts. Shafts revolve on anti-friction pillow blocks, pressure grease lubricated.

Elevator is easily attached to bin by means of heavy channels at right angles to main members.

The KENT MACHINE COMPANY
Manufacturers of CONCRETE PRODUCTS MACHINERY *Since 1925*
CUYAHOGA FALLS, OHIO, U.S.A.

Send complete information and prices as checked below.

☐ KENT Concrete Elevator
☐ KENT AGGREGATE FEEDER
☐ The Complete KENT LINE

Name .....
Address .....
City .....

Largest Block Plant

(Continued from page 141)

sign of the paddles is such that the material is not only violently stirred but the direction is reversed. A relatively low water content is used so that grain is working against grain. At Calipatria, there is a single row of four Wemco attrition machines that operate in series. A minus ⅜-in. feed is maintained and 30 cu. yd. per hour pass through the bank of machines. Wear of impellers in over four months of operation has not been an important factor. The attrition machines are doing an excellent job. After the pumice has passed through the machines, it is screened wet on a 22 mesh screen and the minus fraction wasted.

The staff of Builders Supply Corp. is working on an automatic block cuber, and an automatic offbearer which they hope to have on exhibition at the 1954 concrete masonry show.

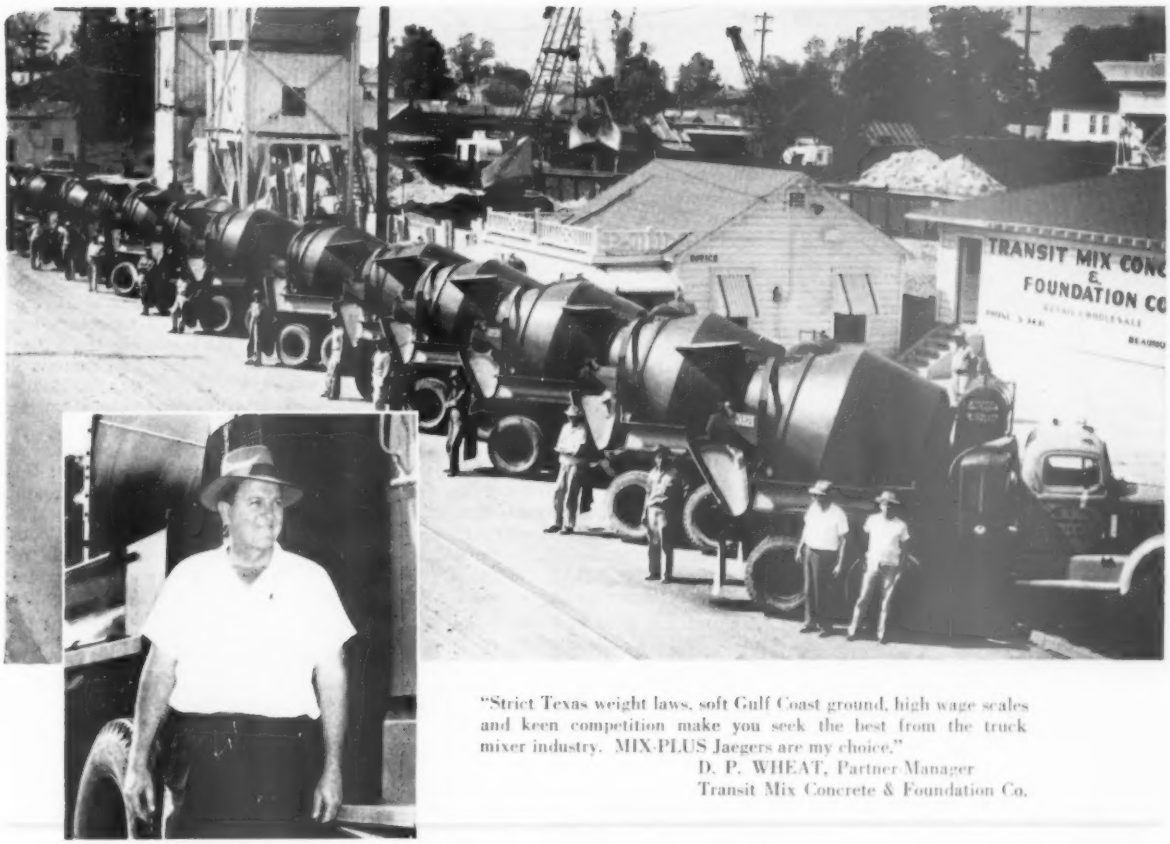
The company maintains a research and testing laboratory at the Phoenix plant. Dr. George Olson, son of Vice-President Gilbert E. Olson is in charge of the laboratory, assisted by E. E. Crile who is also assistant plant superintendent. Bob Mizer is superintendent at Phoenix and Morris Butterfield is in charge of the Calipatria operations. The Builders Supply Corp. has a third block plant at Albuquerque, New Mexico.

Concrete Plant Organized

BREIDENBAUGH BROS., Jasper, Ind., large producer of concrete masonry units, has acquired the property and facilities of Humbarger Transit-Mix, Inc., Washington, Ind., and will operate the plant under the name of Washington Concrete, Inc. The company plans to add a ready-mixed concrete plant to its present facilities, which will include a batching plant, aggregate storage bins, facilities for storing and elevating bulk cement, and a materials conveying system. Transit-mixer trucks from two other plants operated by Breidenbaugh Bros. will supplement those at the plant. The new plant will be under the management of Arnett Breidenbaugh.

Safety Program

MATERIAL SERVICE CORP., Chicago, Ill., recently began a program to promote safe driving of its ready-mixed concrete trucks. Drivers are rated monthly and awarded points which are good for the purchase of wholesale merchandise. Points are awarded on the basis of safe operation, maintenance and clean condition of the trucks, and personal appearance of the drivers. Points are deducted for accidents and safety-rule infractions. According to Irving Crown, executive vice-president, drivers with good safety performance can earn as much as $40 per month in wholesale merchandise.



"Strict Texas weight laws, soft Gulf Coast ground, high wage scales and keen competition make you seek the best from the truck mixer industry. MIX-PLUS Jaegers are my choice."

D. P. WHEAT, Partner-Manager
Transit Mix Concrete & Foundation Co.

D. P. Wheat now hauls 66⅔% bigger payloads with this Jaeger fleet

When Texas began active weight law enforcement, Transit Mix Concrete & Foundation Company, at Beaumont, had a fleet of older type 3 yard mixers on single axle trucks that could not legally haul their rated capacity. To comply, partner-manager D. P. Wheat converted to tandem axle White trucks. However, this proved uneconomic in the face of higher wage scales and keen competition.

By replacing his 3 yard mixers with 4½ yard Jaeger MIX-PLUS models, Wheat found that he could haul 5 yard payloads with the same trucks and drivers — and do it legally with 31,000 lbs. on tandem rear axle and 8475 lbs. on the front.

Moreover, round trips were speeded up by the faster operation of the new truck mixers; concrete could be spotted faster with Jaeger's 13 ft. "to-the-spot" chute and it took less time to temper concrete to customers' requirements because of Jaeger's high pressure water jet (60 gpm @ 65 psi), located in the head of the drum. Wheat's first 10 Jaeger 4½ yard units proved so profitable that he has since purchased 4 more.

Jaeger MIX-PLUS truck mixers, on standard trucks, are engineered to increase your legal payload and number of daily payload trips — and do it without resorting to short-lived construction or unacceptable non-standard drums. For full information, see your Jaeger distributor or send for Catalog TMH-2.

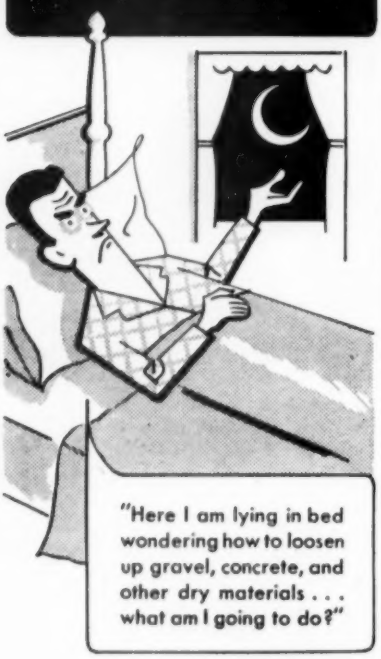
4½ CUBIC YARD MIXER
GUARANTEED TO HOLD MIX AND AGITATE ITS RATED CAPACITIES AND CERTIFIED TO COMPLY WITH TRUCK MIXER MANUFACTURERS BUREAU STANDARDS AS APPROVED BY N.R.M.C.A.
6 CUBIC YARD AGITATOR
N.R.M.C.A.

THE JAEGER MACHINE COMPANY

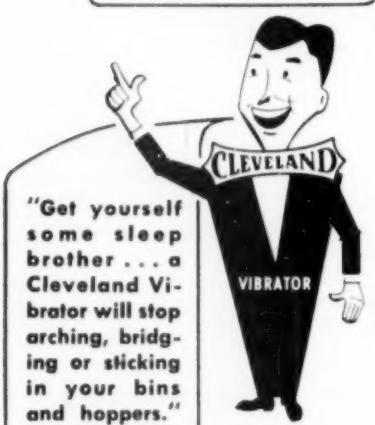
603 Dublin Avenue, Columbus 16, Ohio

Truck Mixers • Agitators • Pumps • Compressors • Concrete Mixers • Paving Machinery

BIN STUCK LATELY?



"Here I am lying in bed wondering how to loosen up gravel, concrete, and other dry materials . . . what am I going to do?"



"Get yourself some sleep brother . . . a Cleveland Vibrator will stop arching, bridging or sticking in your bins and hoppers."

Literature on request.

THE CLEVELAND VIBRATOR COMPANY

2712 Clinton Ave. • Cleveland 13, Ohio

Concrete Masonry Secretaries Meeting

Secretaries of 12 regional associations hold a two-day conference in Chicago with representatives of N.C.M.A.

SECRETARIES of country-wide local, state, and regional concrete masonry associations gathered at the Edgewater Beach Hotel in Chicago on April 13 and 14 for a two-day conference under the sponsorship of the National Concrete Masonry Association. Twelve associations were represented and the conference group numbered around 30 people. Growing pains of the rapidly expanding concrete masonry industry seemed to weigh heavily upon the minds of the association pilots. However, an abundance of capable help was at hand from a number of the wheel horses of the national association. From the staff were E. W. Dienhart, executive secretary, E. J. Bouet, assistant secretary, R. E. Copeland, director of engineering, and W. P. Markert, director of promotion.

From the field of association laymen, Phil Paolella was there to preside with a gentle but firm hand. Available for advice and counsel were well known figures in the industry who had traveled long distances to reaffirm their devotion to association work. Among them were Fred Reinhold, M. E. Rinker, Glenn Barnes, Harold Spaight and George Katterjohn. The conference was internationally flavored by the presence of officials of the National Concrete Products Association of Canada, W. C. Coupland and G. W. Fraser. Mayor L. A. Borgert, St. Cloud, Minn., long time operator of the Borgert Concrete Products, gave an added touch of dignity to the assembly.

Discussion Topics

The visiting secretaries were most inquisitive about budgets, memberships, manufacturing problems and markets, but in all fairness, it should be said that they gave freely of their experiences and provided convincing proof that an association secretary must be both a doer and a thinker as well as skilled in getting along with people.

Surprising activities were brought to light on some of the ancient problems of acceptance of concrete masonry which were generally thought to have long since been decently interred. Inequalities of freight rates on both incoming and outgoing materials, fire ratings on buildings and equipment, revisions of building codes, recognition and acceptance by public officials were cited as requiring perennial attention.

On the educational side, values were stressed of cooperation with architectural and engineering students through personal contacts, literature, and visual aids together with a consistent policy of working with professional groups and participating in joint meetings, conventions and publicity programs.

The advisability of synchronizing efforts with the program of the national association and benefiting from the many economies inherent in such a move called for a special committee and a report of its recommendations. Without involving the autonomy of local groups, the committee felt closer affiliation was desirable. The subject will be further discussed with the individual groups.

It would be expecting too much of human nature for a gathering of this kind to dwell too long on mundane matters when the fields of promotion, publicity, and advertising were looming up. When Chairman Paolella removed the barriers, the speech-making marathon got under way; pacemaker, "Tom" Sirrine, Michigan was well out in front.

The state-wide cooperative advertising plan of the Wisconsin association was enthusiastically explained by Ray Minnette. He carried an armful of blue prints on the subject as evidence that the "on-Wisconsin" movement is under way. W. C. Coupland, president of the Canada association, was no less vocal concerning the publicity program of his members.

Ira Honaman, of the newly organized Eastern Concrete Products Association, maintained the smallest promotional job was important. Witness his aggressiveness in invading the sacred precincts of a big construction job and taking the contractor to task for using concrete masonry on his building and at the same time violating all of the fire ordinances in erecting his construction shanty. The contractor admitted his inconsistency and agreeably promised to rectify the situation.

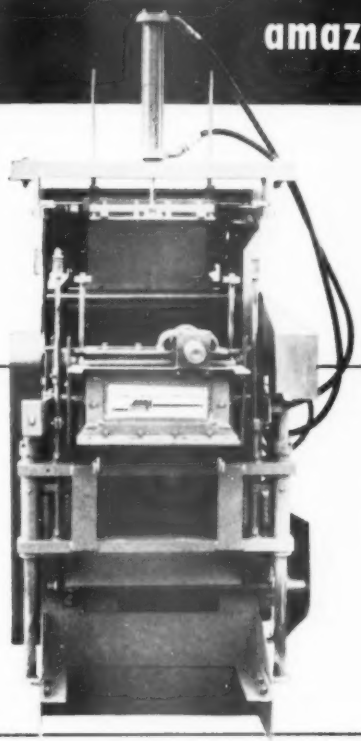
Earl Peterson, representing the Nebraska association, told a thrilling story of a group of 80 concrete masonry houses built in West Omaha. One of them was displayed last July as an exhibition home. Two advertisements in a local paper concentrated buying interest, and all of the houses were sold in eight days. More are being built by the contractor at this time.

There was general agreement that success in broadening the market lies in showing the use of the product in some specific field where its advantages can be seen. This idea was emphasized by many others who were heard on this subject.

The growing popularity of exposed concrete surfaces and the value of utilizing varying sizes and patterns were discussed with enthusiasm. The secretaries voted unanimously to meet again next year at the same place.

Here's why *you* will make *more money* with the amazing—

FLEMING
FMC-180
automatic concrete block machine



- peak production
- low operating costs
- low maintenance
- lowest purchase price

FAST, DEPENDABLE PRODUCTION. With Fleming, you get blocks with sharp edges, smooth surfaces, unsurpassed in strength. And it's fast and *dependable*—FMC-180 normally produces 180 blocks per hour. However, with simple adjustment, production of more than 200 blocks per hour can be attained. Testimonials from many FMC-180 owners show production up to 225 standard stretcher blocks per hour!

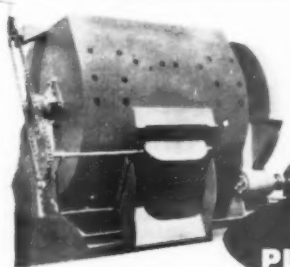
LOW OPERATING COSTS. FMC-180 reduces your operating costs, requires only *one* operator. The simple mold box change saves man hours. Uses a *plain* pallet. It's now available with pressure head, recommended for operation with light-weight aggregate.*

LOW MAINTENANCE. Sealed-in vibration, trouble-free hydraulic power plant and precision engineering throughout assure low maintenance costs. Producers report months of continuous service, with only routine maintenance checks.

LOWEST PURCHASE PRICE! Only Fleming can offer a machine so well engineered at so low a cost. Because Fleming is the *only* major manufacturer of concrete block making equipment that sells *direct to you*. Fleming by-passes the distributors and dealers, passing their profits on to you in the form of extra savings. Fleming can afford the extra manufacturing effort it takes to produce a *superior, fully automatic* block machine, available to you for at least a thousand dollars *less* than any other comparable machine on the market today.

Without cost or obligation, Fleming offers you complete block plant layout service. Send coupon *now!*

Optional at slight additional cost.



For even more profit per block switch to the

FMC-24 PLANT MIXER

Here's the outstanding value in the block equipment field—an FMC-24, convertible from two-sack to three-sack performance by only a change of motor! Guaranteed 100 per cent.

Mail this coupon today!

FLEMING MANUFACTURING CO., INC.

Complete Concrete Block Plant Equipment

187 FLEMING AVE. • CUBA, MISSOURI

FLEMING MANUFACTURING CO.

Please rush information with illustrated price lists on the following to me immediately:

☐ A COMPLETE PLANT LAYOUT

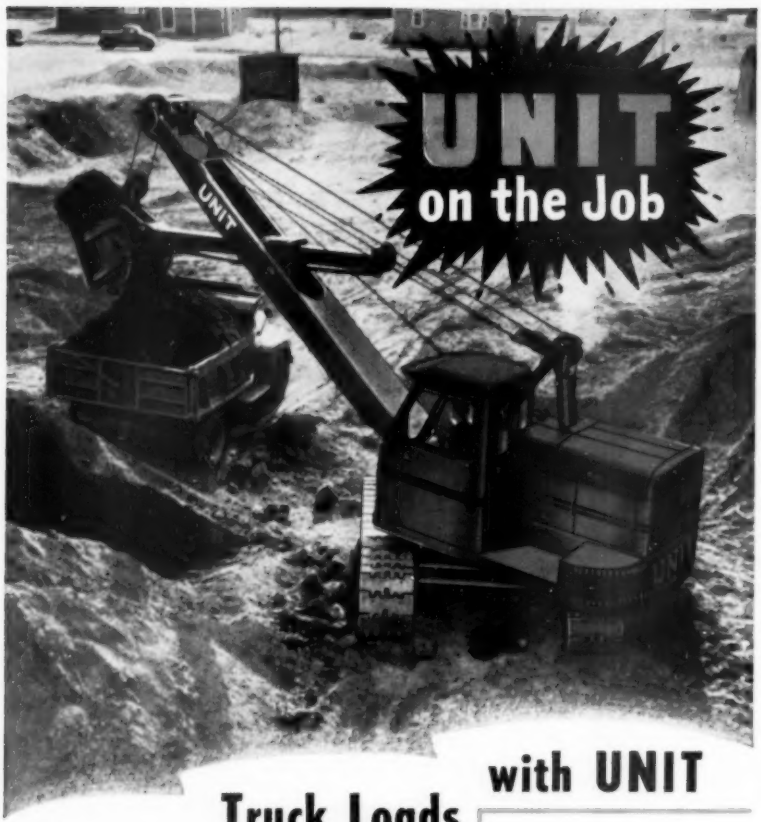
☐ FMC-180 Automatic Block Machine
☐ FMC-12 Mixer (1 sack)
☐ FMC-36 Mixer (4 sack)
☐ FMC-400 Automatic Double Block Machine
☐ FMC-24 Mixer (2 & 3 sacks)
☐ Material Hoppers
☐ Skip Hoists
☐ Racks
☐ Elevators
☐ Lift Trucks

Name .....

Firm .....

Address .....

City ..... State .....



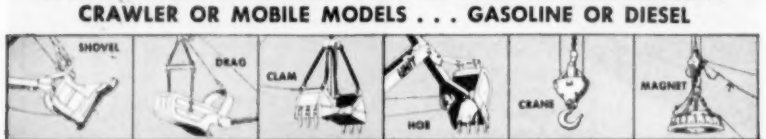
Step-up Truck Loads with UNIT

Here's a UNIT ¾ yard Shovel that's "in there swinging" . . . making big payloads. UNIT'S balanced stability and power permit hard digging . . . produce maximum yardage at low operating cost. Fewer working parts cut down replacements required . . . reduce maintenance costs. The FULL VISION CAB enables operator to see in ALL directions . . . promotes safety . . . increases efficiency. Results in more loads per day and easier load handling. Get the complete UNIT story. Write for literature.

UNIT CRANE & SHOVEL CORPORATION
6431 WEST BURNHAM STREET • MILWAUKEE 14, WISCONSIN, U. S. A.

UNIT

½ or ¾ YARD EXCAVATORS...CRANES UP TO 20 TONS CAPACITY
CRAWLER OR MOBILE MODELS . . . GASOLINE OR DIESEL



All Models Convertible to ALL Attachments!

Letter to the Editor

In re "Air Entrainment In Concrete," [May issue, p. 47] may I put in with your knowledge of the subject by the statement that there never has been, nor ever will be, a portland cement concrete stronger, longer lasting, or less water absorbent than the rocks which compose the Pyramids of Egypt, or, for that matter, the rocks making up present concrete practice.

Introducing air into a steel pipe gives it no greater strength, and a solid piece of steel is stronger, much stronger, than the same size piece of steel with holes in it. That is why they go to the great trouble and expense of cropping over half the bloom in order to get rid of the bubbles produced in the ingot.

If air bubbles in a steel bar gave it strength or durability, wouldn't it be just fine for everybody. The more air the stronger the steel or concrete! But it doesn't, any more than it does in bread or a hole in the seat of your pants.

As an additive for concrete, why not put in loads of bubble gum in the mixer? Or ping pong balls?

It makes just as much sense as it does for concerns to buy their sand, gravel and aggregate by the cubic yard, then by weight mix it with more water and cement and sell it again by the cubic yard.

Just how mixed can they mix the ready-mixed man?

F. Walter Guibert, President,
Automatic Liquid Meter Co.

Los Angeles, Calif.
May 27, 1953

Expands Ready-Mix Plant

WILLISTON CONCRETE PRODUCTS CO., in anticipation of greatly increased business due to the North Dakota oil boom, has expanded facilities at its plant at Williston, N.D. New facilities include a batching plant and four additional transit-mixer trucks of 4-cu. yd. capacities. Two 720-bbl. bulk-cement silos are in use at the plant which is completely winterized for operation in severe weather. Facilities also include a 100-cu. yd. aggregate bin.

Purchases Pipe Company

AMERICAN-MARIETTA CO., Chicago, Ill., recently completed the purchase of Lamar Pipe & Tile Co., Grand Rapids, Mich., which operates plants in Grand Rapids, Saginaw and Jackson, Mich. The acquisition was effected through an exchange of 30,000 shares of American-Marietta common stock and 13,200 shares of preferred for 30,000 shares of Lamar stock. The Lamar company, which will be operated as a division of American-Marietta Co., produces reinforced concrete sewer pipe, precast manhole structures, culverts, concrete bridge sections and drain tile.

Concrete Floors

THE NATIONAL BUREAU OF STANDARDS recently announced the publication of Building Materials and Structure Report 134, entitled "Fire Resistance of Concrete Floors," written by Daniel S. Goalwin. The report, which evaluates the fire-resistance characteristics of concrete floor constructions, includes the following topics: Test Methods; Test Results; Type of Aggregate; Effect of Restraining Forces; Moisture Content; Soffit Protection; Joists; and Effect of Slab Thickness and Density. Illustrations and charts are also included. Copies of the report may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C., for $0.15 per copy.

Prestressed Design Firm

PRELOAD ENGINEERS, INC., newly established firm of consulting engineers in prestressed design and affiliated with Preload Co., Inc., has announced the opening of its offices at 955 N. Monroe St., Arlington, Va. The new firm was established to provide an organization concerned solely with the design of prestressed structures such as buildings, bridges, tanks and pavements.

The services offered by Preload Engineers, Inc., include preliminary inspection and reports; preparation of detailed plans and specifications for construction; estimates of quantities and costs; analysis of bids and assistance in letting contracts; and inspection, consultation and advice during construction.

Concrete Irrigation Pipe

THE CALIFORNIA Agricultural Experiment Station Extension Service, University of California, has announced the publication of Circular 418, "Concrete Pipe For Irrigation," written by Arthur F. Pillsbury, professor of irrigation and irrigation engineer. This 51-page booklet includes the following topics: Types of Pipe Systems; Irrigation Structures Used; How to Arrange for Installation of a Pipe System; Details of Irrigation Structures; Elements to Consider in Planning the System; Properties of Plain Concrete Pipe; Monolithic Pipe Systems; and Contract and Specifications for the Installation of a Concrete Pipe Irrigation Distribution System.

Ready-Mix Plant

HAGARA AND SNELL, general contracting and excavating firm, has established a ready-mixed concrete plant in East Aberdeen, Wash. Four transit-mixer trucks are operated from the plant. Sand and gravel are obtained from a company-owned gravel deposit near Aberdeen. Plant capacity is about 100 cu. yd. of concrete per day. Owners of the company are M. J. Hagara and A. R. Snell.

BATCH & MIX on the job

use the WILLARD "TASK FORCE"

YOU BATCH ON THE SPOT with a self-loading Willard Weigh-Batcher! There's no need to haul concrete from a distant batcher plant . . . no need to erect an expensive stationary batcher.

YOU SET UP with no effort beyond digging a shallow pit for the foot of the conveyor. The Willard mobile Weigh-Batcher is self-loading to a predetermined weight. And its capacity is ample to keep two or more truck mixers busy.

YOU SAVE, too, with a Willard Truck Mixer. There is no auxiliary engine. The drum is geared to the truck motor. This allows two feet shorter wheel base — for short turns and more round trips. The rear axle loading with 3 yards of concrete meets the laws of all states.

THE "WILLARD WAY" is the time-saving way! You get more done with fewer men and machines. *Write for the "Willard Way" booklet.*

Manufactured in Galion, Ohio and Los Angeles

WILLARD CONCRETE MACHINERY SALES CO.
11700 WRIGHT ROAD, LYNWOOD (LOS ANGELES COUNTY), CALIF.

WILLARD Weigh-Batch Loader

WILLARD Mixer Loading Conveyor

WILLARD Truck Mixer

READY MIX *"the Willard Way"*

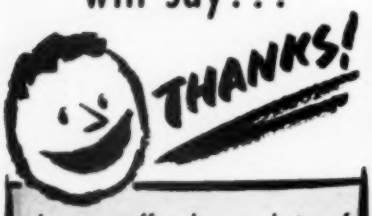
Pure Synthetic Iron Oxide BROWN

Goldenrod	No. 5073	Light and Dark Oak	Nos. 5059, 660
Cocoa Brown	No. 6069	Chocolate Brown	No. 6058
Dark Brown	No. 6059	Light-Medium Brown	No. 641

Distribution Points Throughout the Country

FRANK D. DAVIS COMPANY 2704 Santa Fe Avenue Los Angeles 58, California

Your Customers will say...



when you offer them a choice of

23

DIFFERENT CEMENT & MORTAR COLORS

Made by Williams, this is the broadest selection of fine Cement and Mortar colors on the market. By offering your customers a choice of 23 shades, you can quickly and easily settle upon one having the exact chemical and physical properties your color specification requires.

CEMENT COLORS BY WILLIAMS

Here you have a choice of 18 shades—6 Reds, 3 Greens, 3 Browns, 3 Yellows, 1 Black, 1 Blue, and 1 Orange. Each shade is manufactured to meet the most exacting specifications for cement work—as recommended by the American Concrete Institute and the Portland Cement Association.

MORTAR COLORS BY WILLIAMS

Here you have a choice of 5 different shades — one shade in double strength red, light buff, dark buff, chocolate and black. Each of these colors may be used with excellent results with any standard mortar mix or with a ready-made Bricklayer's Cement.

Write today for color samples and complete technical information on how Williams Cement and Mortar Colors give you superior results. Address Dept. 10, C. K. Williams & Co., Easton, Pennsylvania.

WILLIAMS
COLORS & PIGMENTS

C. K. WILLIAMS & CO.
East St. Louis, Ill. Easton, Pa. Emeryville, Cal.

The precast-concrete bridge shown above, consisting of three 40-ft. reinforced concrete spans, was built on a secondary road in Harrison County, W. Va., in 36 days. It replaces an old covered bridge that collapsed under an overloaded truck. Precast concrete members were furnished by Universal Concrete Pipe Co., Columbus, Ohio

Cement Supply Survey

THE NATIONAL READY MIXED CONCRETE ASSOCIATION recently completed a survey of cement supply for the industry in 1952 and the prospective supply for 1953. The results of the survey were based on replies received from questionnaires sent to member companies. Replies were received from 277 companies, operating in 46 states, the District of Columbia, Hawaii and Canada, which represented a 51 percent return from active members and therefore is thought to be a reliable picture of the situation.

Of the 277 reporting companies, 144 advised that they experienced serious cement shortages during 1952, with 124 of them experiencing a production loss as a result of the shortage; 92 of the companies were forced to shut down their operations for an average of 13 days during the year due to lack of cement.

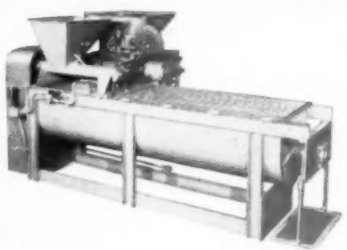
Ninety-six percent of the companies reporting shortages in 1952 listed one or more of three reasons for the shortage: 117 companies (81 percent) indicated that cement production for their area's normal requirements was inadequate; 66 companies (46 percent) indicated that strikes were responsible for the shortage; and 32 companies (22 percent) felt that railroad car shortage was a principal cause.

The shortage was felt largely in states east of the Mississippi and western states bordering the Mississippi. The shortage didn't seem to be acute, however, except in isolated instances, mostly in the southern states. The following states reported severe shortages: the New England states, Delaware, Michigan and Kentucky. About 50 percent of the companies in the following states reported serious shortages: New York, Ohio, Indiana, Wisconsin, Minnesota and the District of Columbia. Shortages in the following states, although not widespread, were reported in certain areas: New Jersey, Pennsylvania, Maryland, West Virginia, Illinois, Iowa and Missouri. A few producers in North Dakota, South Dakota and Nebraska also reported shortages. No shortages were reported in the 11 westernmost states. There was only one report from Canada, but it indicated a severe shortage in Alberta.

In general the cement shortage began in June and became progressively

Jones **(formerly Yoder)**

CONTINUOUS MIXER



Embodies many successful new features, such as positive, non-clogging, vibrating belt feed, insuring constant volume of aggregate regardless of moisture content —no need for costly weighing equipment and moisture determinations.

Accurate proportioning through adjustable aggregate gates. Variable Speed drive for requirements ranging from 5 to 20 cu. yds. per hour. Cost only half that of batch mixer. More thorough mixing—gives up to 50% higher strength than 5-minute batch mix. Special advantages for lightweight aggregates. Illustrated literature and other information on request.

J. A. Jones **CONCRETE MACHINERY**
108 Horning Road, Pittsburgh 34, Pa.

severe until October, tapering off through November and December. Shortages were reported on the widest scale in September and October.

Concerning the prospective cement supply in 1953, in general, the same areas experiencing shortages in 1952 expect a shortage in 1953. It was also noted that more companies expect a shortage in 1953 than actually experienced a shortage in 1952, due primarily to an expected increase in cement demand in Ohio and the middle Atlantic states where large construction projects are planned, including the Ohio Turnpike, the atomic energy plant in Ohio, and the New York Thruway and other large road construction projects.

Concrete Silo Company

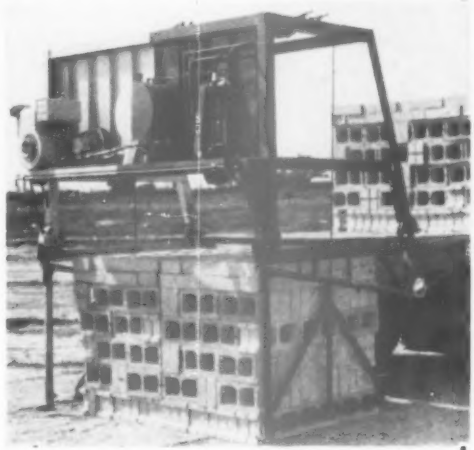
SILICA SILO CO., Chardon, Ohio, recently incorporated, has started production of concrete stave silos, made from silica sand, at the Bestone block plant near Chardon. The Bestone company holds a large share of interest in the new company, of which Glen Gladville, former vice-president of Michigan Silo Co., is president. Walter C. Best is secretary-treasurer; and William N. Clarke is vice-president.

•

KASPER WALSTAD, Grantsburg, Wis., has started operation of a new concrete block plant at Grantsburg. Initial plant production is about 400 block per day.

The NEW SUPERLITE UNLOADER

CUTS UNLOADING COSTS 50%
THE ANSWER TO YOUR UNLOADING PROBLEM
LOW INVESTMENT
HIGH RETURN
UNLOADS 1080 8x8x16 BLOCKS IN 20 MINUTES



- CAN BE OPERATED ON UNEVEN GROUND
- WEIGHS ONLY 1480 LBS. INSTALLED
- FITS ANY STANDARD FLATBED TRUCK
- CAN BE INSTALLED OR REMOVED QUICKLY

SUPERLITE UNLOADER DEALERS:

John W. Meade Co., Denver, Colo.
Contractors Machinery Co., Detroit, Mich.
Contractors Machinery Co., Grand Rapids, Mich.
W. S. Nott Co., Minneapolis, Minn.
Interstate Machinery Co., Omaha, Nebr.
Furnival Machinery Co., Philadelphia, Penna.
Industrial Service Co., Norfolk, Va.

BUILDERS EQUIPMENT CO.
4012 N. Central Ave., Phoenix, Arizona

WRITE FOR ADDITIONAL INFORMATION

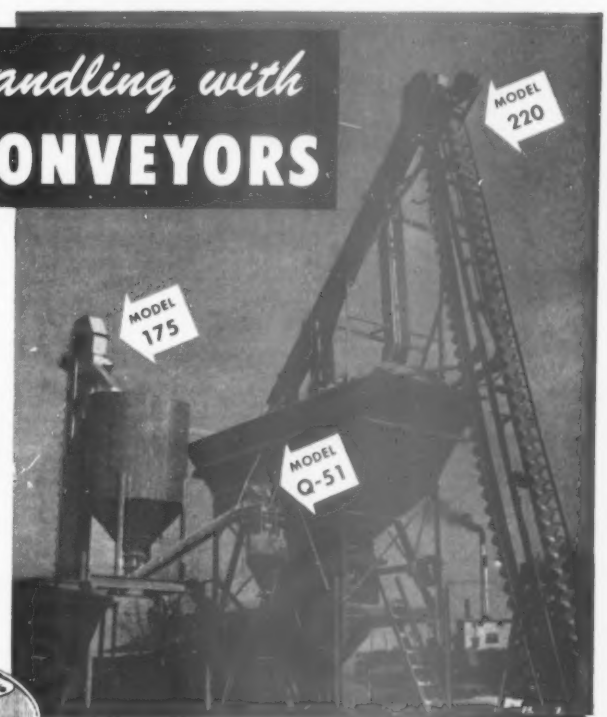
Improve Material Handling with BAUGHMAN *Hi-Speed job-fitted* CONVEYORS

There's a low-cost, Hi-Speed, better-built BAUGHMAN for every contracting need—belt-and-bucket, (Models 175 and 220), troughed belt (Model 230), or screw-type (Model Q-51). Before you buy any portable or stationary conveyor, let your distributor demonstrate BAUGHMAN'S years-ahead features—or write for full details.

BAUGHMAN *builds them BETTER!*

- All-welded ALLOY STEEL construction—17% stronger, 30% lighter, 5 times more rust-resistant
- Splined, lifetime-lubricated universal joints and shaft connections
- Extra-rugged construction where it counts

Model TST-10 Bulk Material Transport Body. To haul cement or other dry powdered material. Completely self-unloading by Twin Auger Discharge. Write for complete literature.



There's a Baughman Distributor Near You!

BAUGHMAN

BAUGHMAN MANUFACTURING CO., Inc.
121 Arch Street • Jerseyville, Ill.

HANG UP NEW "HIGHS" for Block Quality and Profits!

OSWALT Service for Vibrapac owners insures peak production of premium blocks at minimum expense.

OSWALT Shock-Free Block Ejector and Front Pallet Feeder delivers blocks *gently* . . . eliminates green cracking.

New OSWALT device assures uniform height and constant density of blocks.

With OSWALT Service you can now get output of 1080 or more blocks per hour . . . no sacrifice of quality!

Many satisfied customers operating scores of machines.

New OSWALT Bulletin sent on request.

Write for name of Oswalt-Serviced plant nearest you.

OSWALT ENGINEERING SERVICE CORP.

1335 Circle Ave., Forest Park, Ill. Phones: EStebrook 8-3666—FOrest 6-3898

DUR-O-WAL

WITH TRUSSED *Design*

LOOK! . . . Now It's Butt-Welded!

• High tensile, premium quality steel is embedded in the mortar joint for durability when you use Dur-O-wal. This backbone of steel is designed to assure maximum strength by utilizing the trussed design, architecture's oldest reinforcing principle. Dur-O-wal works fast, cuts time, saves money. Investigate this *patented* reinforcing, available in both flush and butt weld, today!

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Cedar Rapids Block Company
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Dur-O-wal Division, Frontier Manufacturing Co.
P. O. Box 49, Phoenix, Arizona

POSITIVE QUALITY CONTROL with NEPTUNE WATER METERS

Simplest, surest way to get consistently better ready-mix batches is *accurately metered* water . . . with a dependable, long life Neptune water meter. Easy to read, saves space, speeds loading, and reduces structural requirements. Your choice of two types: Auto-Stop meter which automatically shuts off the water at exactly the right amount, or manually controlled round-dial meter. Write today for full details.

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NEPTUNE METER COMPANY, 50 West 50th St., New York 20, N. Y.

Branch Offices: ATLANTA • BOSTON • CHICAGO • DALLAS • DENVER • LOS ANGELES • LOUISVILLE • NO. KANSAS CITY, MO. • PORTLAND, ORE. • SAN FRANCISCO

NOW MORE THAN 140 LICENSED MANUFACTURERS *Producing*

Patented
homeward *Concrete* STEPS

A Small Investment That Pays Big Dividends

Homeward all metal forms are precision built to produce a product that requires no hand finishing.

The exclusive franchise for your territory may still be open.

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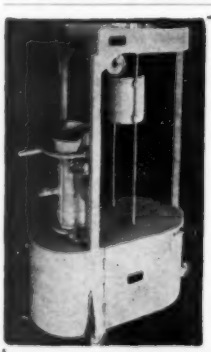


BIG PROFITS — SMALL INVESTMENT

THE FASTEST SELLING, MOST PROFITABLE DRAIN TILE ARE MADE ON THE

MARVEL JR. DRAIN TILE MACHINE

Low in cost, rugged, simple—you are in production the day your machine arrives. Small space, no skilled labor, large production, big demand for products.

We are the World's largest manufacturer of aluminum Specialty Molds for Concrete Products.

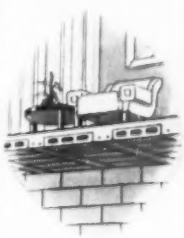
Investigate—Write for Bulletin TODAY

CONCRETE MACHINERY CO.
DRAWER 60-CP HICKORY, N. C.

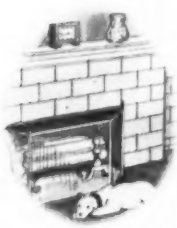
Are you getting ALL the Block Sales out of each job?

When a prospect decides to use concrete block for the foundation and exterior walls of his new house don't overlook your opportunity for **extra** sales. Many producers boost volume by promoting block for additional uses in home construction.

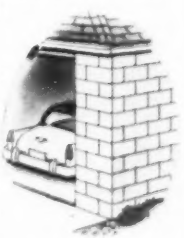
One architectural trend, for example, is the use of concrete masonry for interior walls and partitions. Showing prospects how such walls add real beauty and charm to houses can add to your profits.



The growing popularity of concrete block joist floors affords another opportunity to build sales. Every prospect is interested in floors that can't squeak, sag or burn.



There's rustic charm in a concrete masonry fireplace. Like all block construction it can be painted any of a variety of attractive colors with portland cement paint.



Concrete masonry garages offer another market for your block. They are weather-resistant yet economical to build and often provide space for a workshop or storage room.

Also, extra sales await the producer who points out the many advantages of concrete block for:

Garden Walls • Outdoor Barbecues • Terrace Walls
Back-up for other Masonry Materials

Write for free literature on these or other uses for concrete masonry, sent only in U.S. and Canada.

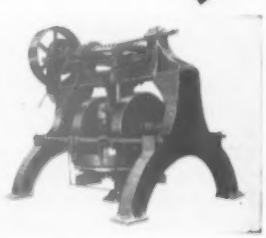
PORTLAND CEMENT ASSOCIATION
Dept. A7-45, 33 West Grand Avenue, Chicago 10, Illinois

A national organization to improve and extend the uses of portland cement and concrete through scientific research and engineering field work

Grinds up to 30 YARDS of aggregate PER HOUR!

"American" No. 9 grinder delivers 30 yards of ground cinders hourly at Cement Products Corp., Mansfield, O.

HERE'S WHY AN *American* GRINDER IS THE *RIGHT* GRINDER FOR YOUR PLANT . . .



- Needs no screen plates
- Handles material wet or dry
- Adjustable to your volume and size requirements
- Requires only minimum maintenance
- Has low power consumption
- Good for years of trouble-free operation

YOU CAN'T BEAT AN "AMERICAN" FOR GRINDING

- CINDERS
- HAYDITE
- PUMICE
- SLAG

and a wide range of quarry and mine products.

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1—28 cu. ft. STEARNS Skip Loader $950.00
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2—12 cu. ft. STEARNS Concrete Mixers ..... each $300.00
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MORTAR COLORS
made by
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About 7 years old and in very good condition. Has been steam cleaned and painted. Available immediately.

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With U.B. Line stretchers the most economical way, to keep your name before your mason's and mason contractors every working day of the year. Line pins, twigs, corner ties, and tools for the Blocklayer.

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NEW APPLEY CONCRETE BLOCK MACHINE PALLETS

542—8"x16" Pressed steel open ends ....@ .50
341—8"x16" Pressed steel closed ends ....@ .50
231—8"x16" Cast aluminum open ends ....@ .65
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82—12"x16" Cast aluminum 3 oval cores ....@ .90
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Special price for the lot, $715.00 F.O.B. Boston

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An expanded shale aggregate for lightweight block and concrete

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COMPLETE CONCRETE PIPE PLANT EQUIPMENT

(1) Concrete pipe machine—12"—72" diameter. 4 ft.—8 ft. lengths (2) Besser Mixer. (3) Besser Skip Loader. (4) Wire Roller. (5) Boiler, etc. Guaranteed A-1 condition.

BOX L-63, CONCRETE PRODUCTS, 309 W. Jackson Blvd., Chicago 6, Ill.

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Advertising necessities for the block industry. Line Pins, Twigs, Modular Coursing Stick. Also the new Block Calculator and Wood Corner Block. All imprinted with your advertising. Complete catalog on request.

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Dunbrick machine, complete with mixer, racks, 4,500 pallets—400 double, nearly new. Bargain.

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Beltsville, Maryland

STOP *that* WATER
With FORMULA NO. 640
A clear liquid—7 different resins in a solvent which penetrates 1" or more into concrete, concrete blocks, stucco; seals, holds 1250 psf water pressure. Applies quickly — no mixing — no furring — no membranes—no cleanup. Use on forms—wood or concrete.
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INDUSTRY TRENDS
THROUGH
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BIONETIC is a safe, sure, economical method.
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SACRIFICE SALE TO DISSOLVE CORPORATION

Complete plant set-up offered for a quick cash price. Operated from July 1946 to May 1953, when it was dismantled and stored. Every piece of equipment was overhauled, needed parts replaced and repainted in February 1953. Will stand rigid inspection. Every machine was working fine when we stopped operating in May. A real bargain.

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We also offer for quick cash sale the following additional machines: Barret-Cravens Power-Ox Two Ton Lift Truck with overnight charger and battery. In excellent condition. (Cost us $1700.00) Sell for $525.00. Farquhar Undercar Unloader, 19 feet long, with 18" almost new belt, 3 H.P. motor mounted on frame, adjustable wheels, 65 feet of cable and fittings. (Present cost about $1200.00). Sell for $325.00. Farquhar Portable Conveyor for aggregates, 16 ft. long, 2 H.P. motor mounted on frame, uses 10" wide belt, has 50 ft. of cable and fittings. No wheels; has measuring hopper, two men can carry and place it anywhere. Very useful around block plant. (Cost new about $500.00). Sell for $225.00.

ALL PRICES F.O.B. CARS AS PLANT OUTFIT ABOVE

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FOR SALE

1—59 Joltcrete with power delivery and height control.
1—Vertical cylinder type off-bearing hoist with track boom.
1—4x8x16 attachment.
1—6x8x16 attachment.
1—8x8x16 attachment.
1—8x8x18 attachment.
2—12x8x16 attachments.
7800—8x8x16 modular 2 core steel pallets.
1200—8x8x16 modular 2 core corner & sash steel pallets.
2700—12x8x16 modular 2 core steel pallets.
5000—6x8x16 2 core steel pallets open end.
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E. P. HENRY & SON
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Phone: Woodbury 2-2380

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60—Block Racks.
800—18" x 18" x 5/16 Steel Pallets.
1—28 S Stearns Mixer with New Complete Set of Liners. Assortment of Lith-I-Block L 3 Attachments.

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GRAND ISLAND, NEBR.

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IS READ BY THOSE WHO BUY YOUR PRODUCTS

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PRICED FOR QUICK SALE

1—Stearns Model 9 Joltcrete complete with dual vibration, power carriage and power offbearer.
1—8" Attachment with 4,500 pressed steel 50% air space pallets.
1—8" Header block attachment.
1—3" Attachment with 4,000 pressed steel pallets.
1—4" Attachment with 3,000 pressed steel pallets.
1—12" Attachment with 2,000 pressed steel 50% air space pallets.
60—Model 72 steel racks.

All equipment guaranteed to be in perfect condition and offered at sacrifice prices. Cash or terms. If desired we will install machinery in your plant and train your crew in its operation.

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ROCK RAPIDS, IOWA

A LIFETIME OPPORTUNITY

Make $1,000 monthly as easy as rolling off a log, building blocks in Real Stone Color and Design in your back yard. Also applying stone siding, cost only $6.00 per square, deposit for equipment only $300.

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1—W. E. Dunn cement mixer complete with skip hoist and 5 HP motor for tile or block plant. Very good condition. A buy at $850.00.

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DURAND, MICH. PHONE 303

FOR SALE

Champion drain tile machine.
Attachments for 4", 5", 6" and 8" tile.
Dunn automatic feeder.
15—3'x6' double deck hinged racks.
$500.00 worth of spare parts.
First $1,300.00 takes it.

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Fremont, Ohio

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60' bucket elevator, complete with 7½ HP motor and hopper $2500.

Multiplex Model T power tamp block machine. Complete, ready to go.

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Besser Vibra-pac V-3M equipped with Oswalt Attachments and Height Control. Presently making 900 8"-Equivalent Blocks per hour. 50 cubic foot mixer included. Both in good condition. Inquire at:

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manufactured by

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IMMEDIATE DELIVERY WITH QUICK ACTING DOORS. EACH KILN IS CAPABLE OF CURING 4000 8" EQUIVALENTS. PRICED FOR QUICK SALE. IF YOU ARE INTERESTED IN HIGH PRESSURE CURING, IT WILL PAY YOU TO INVESTIGATE AT ONCE.

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Binghamton, N.Y.

UNBREAKABLE
PALLET RINGS
Write for full information
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LUFKIN, TEXAS

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Model 9 Joltcrete with offbearer, air compressor, 2 turntables, 10" mold box like new, 4" mold box, 8" mold box hard core finish (used about 2 months); 4000 8" steel pallets, 2000 4" steel pallets. Many extra parts. This machine is in very good condition.

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Corner Southern Blvd. and Mathews Road
Youngstown, Ohio

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2 — Block Lith-I-Block Machines, complete with all attachments.
70 — 60-block steel racks.
2100 steel pallets.

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Steel forms, such as manufactured by Kirk and Blum Mfg. Co., for use in precasting 12" I Beam type concrete joists. Also used 12 cu. ft. Mixer and skip loader.

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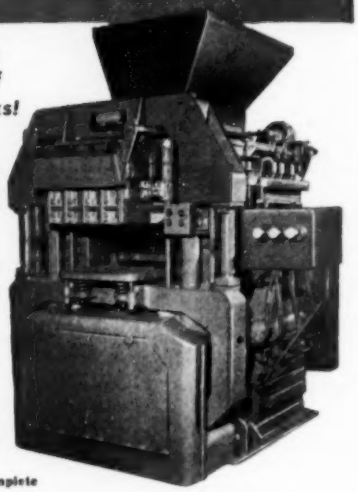
NEW, IMPROVED
Columbia's Fully Automatic 2-BLOCK

Leads the field in fast production of high quality blocks!



Rugged construction dependable operation, low initial investment—backed by years of manufacturing experience—assure the Columbia owner more profitable block production.

Columbia's Model 8, with electronic controls, is today's outstanding 2-block machine! Write today for details!

FREE! Catalog of the complete Columbia line.

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Columbia MACHINE WORKS
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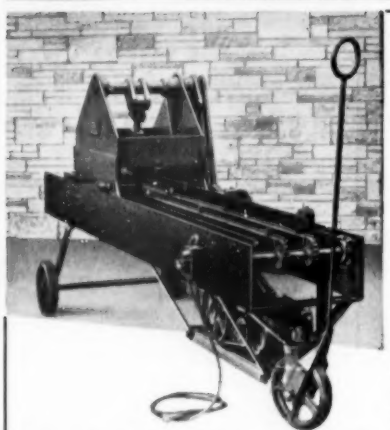

SAVES LABOR

SAVES HANDLING

LOW MAINTENANCE

LONG LIFE

34 SPLIT UNITS A MINUTE

Automatically assures split in exact center of block regardless of block variations.

Quickly adjustable for size of block.

the TRU-AX BLOCK SPLITTER

CASH IN ON THE GROWING DEMAND FOR SPLIT CONCRETE BLOCK WITH THIS STURDY PORTABLE MACHINE

ITS MOBILITY SAVES LABOR AND HANDLING. CAN BE MOVED FROM RACK TO RACK ELIMINATING A CUBING OPERATION AND THE LABOR OF ONE OR MORE MEN.

HAND AND PNEUMATIC OPERATION MODELS ALSO AVAILABLE

The TRU-AX HIGH PRODUCTION BLOCK SPLITTERS are patented and embody the best in engineering design and are field tested for dependability and performance.

Write Today for Information

TRUAX MACHINE & TOOL CO.
16 Michigan St.
Seattle 8 Washington

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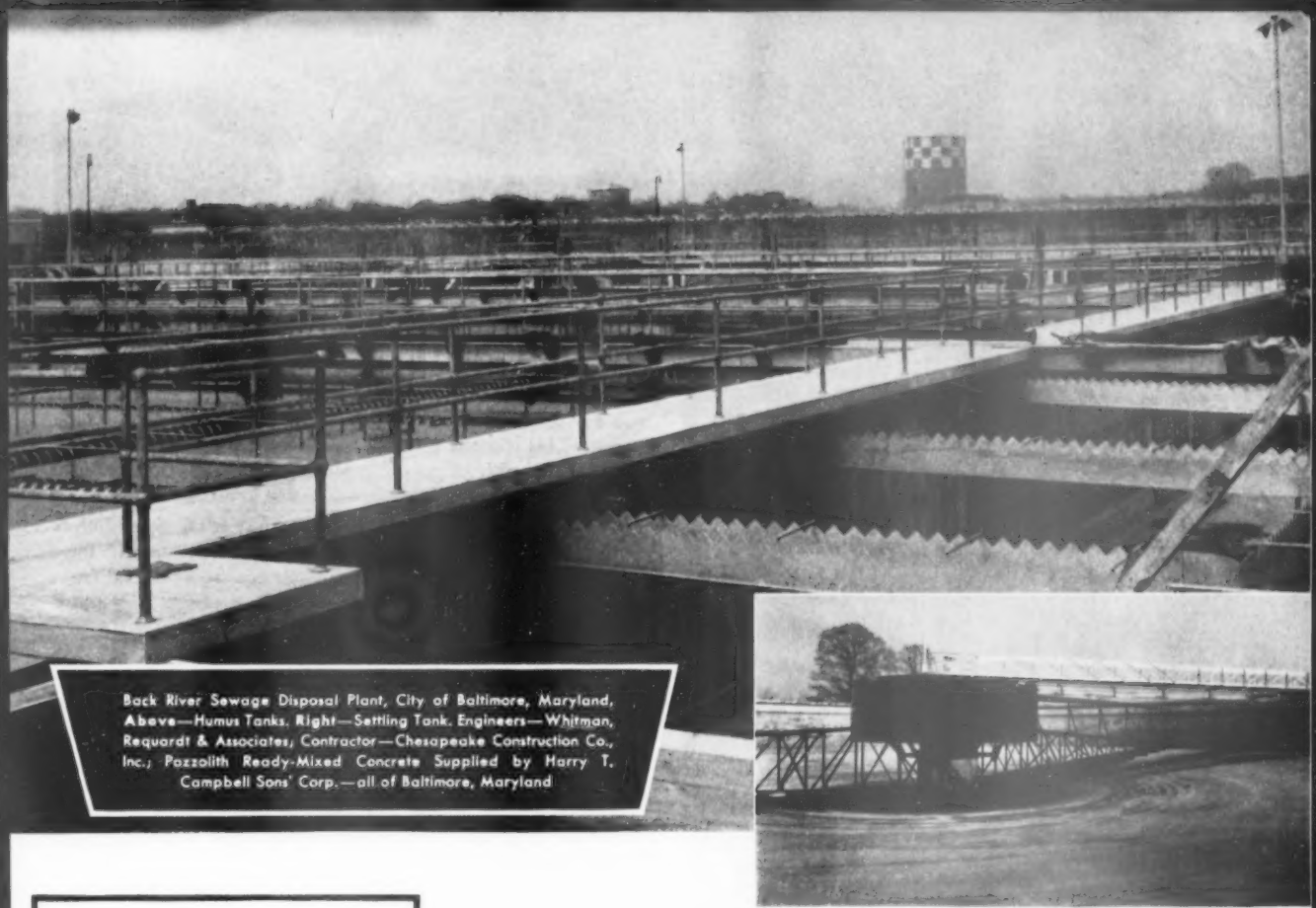

Back River Sewage Disposal Plant, City of Baltimore, Maryland, Above—Humus Tanks. Right—Settling Tank. Engineers—Whitman, Requardt & Associates; Contractor—Chesapeake Construction Co., Inc.; Pozzolith Ready-Mixed Concrete Supplied by Harry T. Campbell Sons' Corp.—all of Baltimore, Maryland

CEMENT DISPERSION ALSO KEY TO SUPERIORITY OF COLORCRON— ANOTHER MASTER BUILDERS PRODUCT

COLORCRON...

A pre-mixed, ready-to-use dust-on material for coloring and hardening concrete floors or pavements. Provides beauty and long wear for light traffic areas in and around homes, churches, apartment houses and offices. Available in a wide range of colors.

Superior Concrete Today and Tomorrow... with POZZOLITH

Improved concrete properties obtained with Pozzolith resulted in important advantages during the construction of this $2,000,000 sewage works project . . . will provide equally important advantages throughout the life of the plant.

Ideal workability with reduced water and good cohesiveness provided easy placeability for thin wall sections, low shrinkage and no segregation.

Other immediate benefits obtained with Pozzolith were designed strength, high bond of concrete to steel and low permeability.

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Pozzolith provides these benefits — *at lower cost than by any other means* — because it disperses cement, reduces water and entrains the *optimum* amount of air.

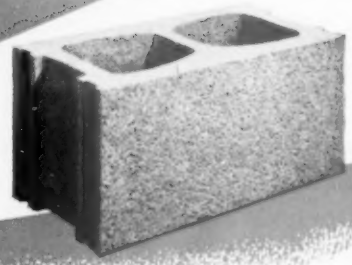
Full information on request.

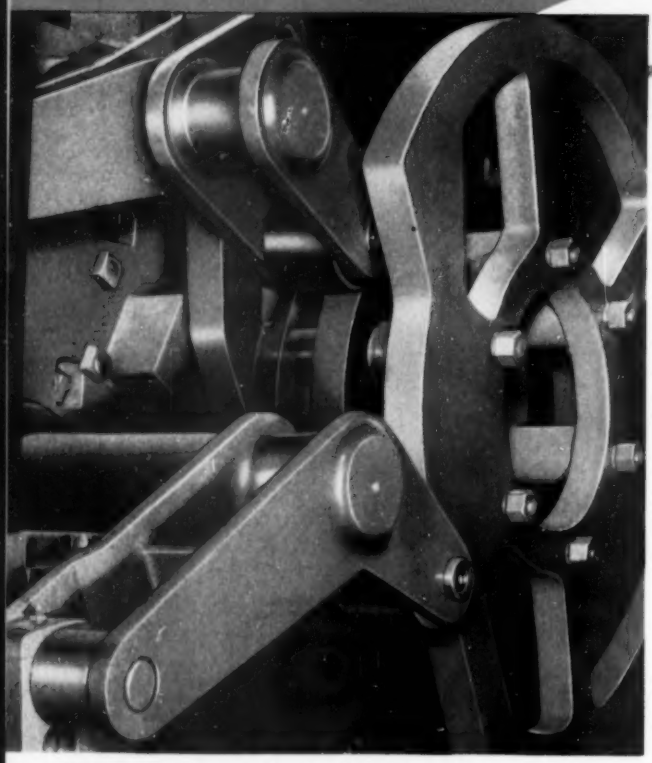
Over 600 Leading Ready-Mix Plants
Are Producing Pozzolith Ready-Mixed Concrete

the MASTER BUILDERS Co.

CLEVELAND 3, OHIO — Subsidiary of American-Marietta Company — TORONTO, ONTARIO

Only a Besser Vibrapac is *Fully CAM OPERATED!*





Illustrating the cam and roller principle of the Besser Vibrapac. Only a few moving parts. You get high production with these slow, revolving cams and long machine life.

Many concrete block plants are now running on a 24-hour a day schedule of uninterrupted production, day-in and day-out. This is made possible by the exclusive Besser cam and roller principle of power application which assures smooth, continuous operation.

The rugged steel cams and heavy duty alloy steel rollers and large diameter shafts provide an exceptionally long service life and dependability. The cams are machined from a single piece of steel having a thickness of 2". The entire wearing surface is heat treated and hardened.

Let's examine a Vibrapac. You'll find there are no pistons . . . no valves . . . no leaking liquid . . . no interlocked operations. One operation does not trip the next. Each one is perfectly timed. There are no lost motions between the various operations of feeding . . . vibration . . . striking off surplus concrete. . . stripping finished block . . . delivering finished block to front of machine . . . and placing new pallet under mold. This accounts for the unusually high production of uniformly high quality block.

Only a Besser Vibrapac is fully cam operated. The rugged simplicity of the Besser Cam and Roller principle of operation is one of the greatest contributing factors to the universal acceptance of the Automatic Vibrapac.

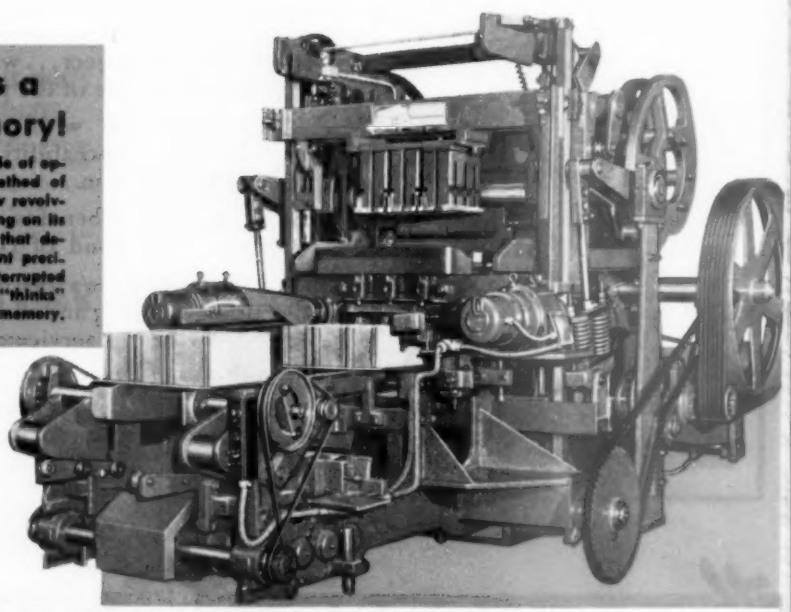
BESSER MANUFACTURING COMPANY

Complete Equipment for Concrete Products Plants

Alpena, Michigan, U.S.A.

A CAM has a Perfect Memory!

The cam and roller principle of operation is the simplest method of power application. A slow revolving cam, with a roller riding on its surface, actuates an arm that delivers power with pin point precision and with steady, uninterrupted regularity. A cam virtually "thinks" for you . . . has a perfect memory.



Front Pallet Feed Vibrapac

— the modern, fully automatic concrete block machine. Produces three 8" x 8" x 16" modular units at a time on one plain pallet. Other sizes produced in equivalent multiples on the same set of plain pallets. No machine operator is required. Hand labor is reduced to pushing a switch button and guiding a power offbearing hoist. One man removes finished block, and, with no lost motion, returns empty pallets to the Vibrapac.

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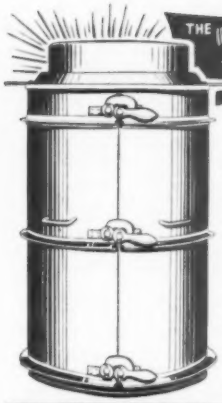
BATCH MIXERS | SKIP LOADERS | BLOCK & BRICK CUBERS | SUPER VIBRAPAC | SINTERING PLANTS | ACROW CENTERS | ROOF TILE MACHINE

A 7280–1PBC



THE "Quinn Standard"

FOR CONCRETE PIPE

The Quinn Standard is known as the best the world over, wherever concrete pipe is produced and used. Backed by over 35 years' service in the hands of hundreds of Quinn-educated contractors, municipal departments and pipe manufacturers who know from experience that **Quinn pipe forms** and **Quinn mixing formulas** combine to produce the finest concrete pipe at lowest cost.

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For making pipe by hand methods by either the wet or semi-dry processes. Built to give more years of service—sizes for pipe from 10" up to 120" and larger—tongue and groove or bell end pipe at lowest cost.

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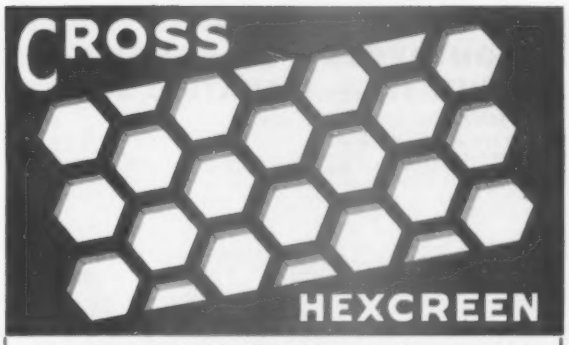
Also manufacturers QUINN CONCRETE PIPE MACHINES

QUINN WIRE & IRON WORKS 1603 12TH ST. BOONE, IA

CROSS



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Complete Line of Radial and Thrust Cylindrical Roller Bearings

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ROCK PRODUCTS

Slurries... handled at lower cost

The new WILFLEY MODEL K Centrifugal Sand Pump embodies important mechanical improvements especially adapted to the handling of cement slurry and results in stepped-up production and substantial power savings. Individual engineering. Write for details.

Buy WILFLEY for Cost-Saving Performance

A. R. WILFLEY & SONS, Inc.
Denver, Colo., U.S.A.
New York Office: 1775 Broadway, N.Y.C.

WILFLEY centrifugal PUMPS

CLASSIFIED ADVERTISEMENTS

CONVEYORS — CONVEYOR PARTS — IDLERS
CRUSHERS — VIBRATING SCREENS — SCALES

TROUGHING IDLER CONVEYORS

We will take our loss on our stock of short length belting and previous model idlers. You can save as much as 50% by buying the BONDED CONVEYOR SPECIALS listed below and accepting your conveyor or belting in two pieces. Idlers, belting and conveyor sections are all new.

Quantity	Belt Width, Inches	Length of Conveyor, Feet	List Price	Sale Price
1	18	25	$1229	$ 658
1	18	35	1559	814
1	18	50	2054	1043
1	18	85	3209	1581
1	18	125	4529	2096
1	24	25	1322	739
1	24	30	1507	824
1	24	45	2062	1085
1	24	65	2721	1451
1	24	85	3542	1806
1	24	100	4097	2037
1	30	25	1421	806
1	30	35	1841	997
1	30	50	2471	1588
1	30	65	3101	1617
1	30	80	3731	2295
1	30	100	4571	2768
1	30	125	5621	2818

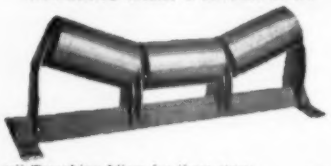
Belting is 4 ply, 28 oz. duck belt, 1/8" top rubber cover and 1/32" bottom cover.

CONVEYOR BELTING

Famous brands at deep cut prices. Fresh stock.

Width	Ply	Top Cover	Bottom Cover	Duck Carcass	Price
14"	4	1/8"	1/32"	28 oz.	$2.36/ft.
16"	4	1/8"	1/32"	28 oz.	2.46/ft.
18"	4	1/8"	1/32"	28 oz.	2.56/ft.
24"	4	1/8"	1/32"	28 oz.	3.23/ft.
30"	4	1/8"	1/32"	28 oz.	3.97/ft.

TROUGHING IDLERS & RETURN ROLLS



3-roll Troughing Idlers for these sizes:

16" belt	$12.25	30" belt	$19.50
18" belt	18.00	36" belt	20.25
24" belt	18.75	48" belt	21.75

1-roll Return Idlers for these sizes:

16" belt	$6.75	30" belt	$8.25
18" belt	7.13	36" belt	8.75
24" belt	7.50	48" belt	10.25

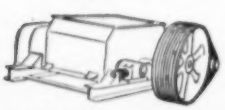
All steel. Interchangeable with other well-known makes. Replaceable ball bearings. Rust proof ball races; maintenance is negligible.

BUILD YOUR OWN CONVEYOR

Ready-Made Head, Tail and Intermediate Conveyor Sections
All Types Idlers, Return Rolls and Belting in Stock

Holdback	Head & Tail	Roll Idler	Self-Aligning Idler	Guide Idler	Wing Pulley
$90.00	$171.00	$6.38	$56.50	$13.75	$64.00

CINDER, PUMICE, PERLITE CRUSHERS

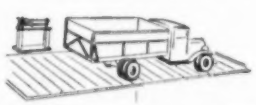


Bonded double roll crushers. For crushing cinders, pumice, perlite, and similar materials. Capacities to 100 tons per hour. Steel hoppers included.
Priced from $479.00

VIBRATING SCREENS

Heavy duty eccentric-shaft types; 1 to 5 decks, 3'x8' to 5'x14'. Others from 2'x4'. Wire cloth or plate included to your specifications.
Priced from $431.00

MOTOR TRUCK SCALES



30 Ton Truck Scales $525.00
26 Ton Truck Scales 582.00
33 Ton Truck Scales 825.00
Others to 50 ton capacity. All scales complete with structural steel. Parts and weighing beams for most makes of motor truck scales.

Stock Models of All Types for Immediate Shipment—Special and Unusual Conveyors Built to Order — Complete Systems Designed, Engineered and Manufactured

WRITE FOR CATALOGUE AND PRICES

BONDED SCALE & MACHINE CO.

Manufacturers of Truck Scales, Vibrating and Shaker Screens, Crushers & Feeders

128 Bellview — **Columbus 7, Ohio**

PHONES: GArfield 2186; FRanklin 6-8898, Evenings

EIGHMY "SPECIALS"

Material Loaders

Pettibone Mulliken "421" Swing Loader, ¾ yd.; 4-wheel drive. Demonstrated 30 hours @ Dealer's Cost.
Haiss "77C" Crawler Bucket Loader. Reconditioned.
Cletrac "DDH" Diesel Tractor w/ Drott Hi-Lift Front End Loader, 1½ yd. Bucket.

Transit Mixers

Smith 2 yd. Hi-Discharge Mixer, used 500 yds., on truck.
Smith 3 yd. Hi-Discharge Mixer, without truck.
Rex 2 yd. Hi-Discharge Mixer w/Ford truck.
Rex 2 yd. Hi-Discharge Mixer w/Chevrolet truck.
Jaeger 3 yd. Hi-Discharge Mixer w/Chevrolet tandem truck.
Rex 3 yd. Hi-Discharge Mixer, unmounted.

Cranes & Shovels

Unit "514" ½ yd. Trench Hoe. Brand new attachment.
Link-Belt "LS-50" ½ yd. Dragline, 20' Boom & Fairlead.
Osgood "200" ½ yd. Dragline, 20' Boom & Fairlead.
Schield-Bantam M-47 Hoe & Crane, mounted on Half Track, @ $4500.

Miscellaneous

Trailer 18-Ton Single Axle, semi-Low Boy w/ Mack Tractor.
Cedarapids Portable Primary Plant on Pneumatics w/1524 Jaw Crusher, 24"x6'0" Apron Feeder, gas power, 30" discharge conveyor, etc.
Universal 880 Jr. Portable Gravel Plant, 1024 Jaw, 24x16 Rolls, etc., Pneumatics.

EIGHMY EQUIPMENT CO., Rockford, Ill.

DON'T MISS THIS ONE

If You're Looking For Euclids

2—9 Yard Bottom Dumps
$3000.00 each.

22—13 Yard Bottom Dumps.

1—7BV Euclid Loader.

1—8TDT-14SH Single Engine Scraper.

1—68FDT-17SH Twin Engine Scraper.

1—HD-19 Allis Chalmers Tractor.

Prices on Request.

All Units From Our Rental Fleet Ready To Start Paying-off Now

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47 W. 7 Mile Road — **Detroit 3, Mich.**

Forest 6-1000

Special Crushers ! !

Raymond High Side 4 roll Pulverizer, No. 6047
Pennsylvania C-4-30 Reversible Hammermill.
Cedar Rapids 4033 Hammermill. Diesel powered.
Raymond No. 412 bowl pulverizer mill.
FARREL BACON 36" x 48" Jaw Crusher.
Traylor TY 4' with 200 hp. electric motor.

DREDGES

Ellicott 12"x10" new pump with new V-12 885 HP Diesel engine. Port. steel hull.
Ellicott 8" with cutter. Diesel Hull 48'x18'x3'6".
8" Hydraulic. Diesel. On 32'x8' steel pontoons.
Amsco 10" Diesel power portable. Excellent.
6" portable Diesel complete with cutters, etc.
8" H-P twin Diesel drive. Complete.

CONCRETE PLANTS AND EQUIPMENT

Heltzel 1000 bbl. cement silo with elev. scales, etc.
Smith 56-S two yard tilting mixer. Complete.
Port Erie Strayer Concrete Plant 30-40 T.P.H.
Blaw-Knox 300 ton 4 compt. aggr. bin.
54-B weighbatcher conveyor truck hopper apron feeder bucket elevator.
Butler #7 Cement Track Plant 250 bbl. p.h.
Large plant 212 yd 6 compts. agg. & cement elevators, 56-S Mixer.
Butler 250 bbls. cement bin with B-K 100 ton 3 compt. agg.
NEW F-S 100 ton agg. bin 3 compt.
NEW F-S 400 bbl. cement bin complete.

CRUSHING PLANTS

Cedar Rapids Portable Super Tandem, excellent.
Pioneer 40-V. New 1946. Portable. Diesel power
Pioneer WA-300, crushing, washing, screening.
Pioneer Portable Plant with 24 x 36 jaw primary and 40 x 22 triple roll secondary. New, 1950.
Pioneer Secondary Plant. Port. 100 T.P.H. 1¾".

CRUSHERS

JAW: Acme 10x20, 14x26, 14x28, 10x42, 16x32, 18x32, 25x40. **Eagle** 20x36. Diamond 24x36".
Cedar Rapids 10x20, 20x36, 25x40. Farrell 10x20, 13x30, 14x36, 18x36, 36x48. Buchanan 36x42.
Good Roads Reliance 15x30. Traylor 18x36, 24x36.
Allis-Chalmers 30x18. Good Roads 10x30. Telsmith 18x32. Champion 1036, 1040, 1236, 1536.
GYRATORY: Allis-Chalmers-McCully, 6", 7½", 8", 9", 12K, 20", 30", 42", 14". Newhouse, 24", 36".
Gyrasphere, 18", 28". Intercone Telsmith, Telsmith 5H, 10-B, 13-B, 16-B. Kennedy Van Saun 7, 10, 25½-S, 37. Traylor Ty 1'5". Ty 2'4", T-4½".
ROLL: Cedar Rapids 40x20. Diamond 40x22. Pioneer 36x18. Telsmith 24x16. Pioneer 30"x18". New Holland 24x16.
HAMMERMILL: Size 4 Williams Jumbo, Pennsylvania SX2, 22x22. Cedar Rapids 20x33. Jeffrey 36x42, Jeffrey 36x24, 36x40. Dixie 3650.
BALL MILL: Hardinge 10'x48". K.V.S. 6'x8' Type M Air swept J-H 6'x6', Hardinge Conical 6'x22". Colorado Iron Works 5'x6'; Marcy No. 64½. Hardinge conical 10'x36".
ROD MILL: March 2'x8', 3'x6'. Allis-Chalmers 4'x8'. Hardinge No. H 206. Marcy 8'x12'. Hardinge 8'x22".
CONE: Symons 3' coarse bowl, 8' standard head.
TUBE MILL: Smidth 5½x20, K.V.S. 4'x7', Traylor 5'x22'.
DRIERS: Struthers-Wells 7'x64'; others 7'x20', 6'x80', 7'x70', 6'x40' and Cedar Rapids 60"x24'.

SHOVELS—CRANES—DRAGLINES

N-W 80-D 2⅝ yd. Dragline. Diesel. 100' boom.
N-W Model 6, 1⅛ yd. Diesel Shovel.
Lima Mod 34, 1 yd Shovel-Crane-Dragline. Gas.
Buc-Erie 51-B Diesel Shovel. Practically new.
Northwest 80-D Diesel Shovel 2½ yd. Recond.
Lorain L-820 2 yd. Shovel-Drag-Crane 100' Bm.
Northwest 80-D Shovel-Drag. New 1948. Excellent.
Lima 1201, Comb. Shovel-Drag, 80' Bm.
Lima 1201, 2⅝ yd. Diesel Shovel.
Manitowoc 3500, 2½-yd. High Lift Shovel.
Link Belt K-595 dragline, 2⅝ yd., 8 ft. boom.
Buc-Erie 54-B Diesel Shovel, 2½-yd.
Lorain Model MC 414, Moto-Crane, 85' Bm. Exc.

SCREENS

Allis-Chalmers 5'x14' dbl. deck Riple-Flo.
Kennedy-Van S. 4'x10' three deck.
Telsmith heavy duty washer 30"x13'.
Diamond 4'x10' three deck.
Lippman 4'x12' single deck.
Simplicity 4'x10' four deck.
Symons 4'x14' double deck.
Tyler 4'x10' two deck heavy duty, motor, Gen. Set. Rebuilt.

TRACTORS

2 Cat. D8 Angledozers with DDPCU rebuilt.
Int. TD-18A with B-E Bulldozer.
Int. TD-24 with B-E Cable Bulldozer.
A1-Chal HD19 Angledozer, Hydraulic.
A1-Chal HD7 with Gar Wood angledozer.
Allis-Chal. HD-19 with hydaulic control angledozer.
Cat. D4 Tractavator with 1 yd. bucket, hydraulic.

LOCOMOTIVES

45 ton G.E. Diesel Elec. Loco. std. ga.
25 ton Plymouth gas loco. std. ga.
Vulcan 20 ton standard gauge type 0-4-0 gas.
20 ton Vulcan gas, std. ga., rebuilt.
25 ton Vulcan steam std. ga. Side tank.
15 ton Whitcomb 36" ga. gas.
Plymouth Model ULDA standard gauge 10 ton diesel.

DERRICKS

American Terry 20 ton Guy Derrick 100' bm.
Clyde 30 ton stiff leg 90 ft. boom.
Guy Derrick 15 tons 115' mast 105' boom
American 25 ton stiff leg derrick 90' boom.
Special 35 ton stiff leg derrick 100' boom.
Nat'l. Bridge 30 ton Guy Derrick 100 ft.
American 30 ton stiff leg 100' boom.

ASPHALT PLANTS

B-Green Port. continu. 842 Mixer, 832 Dryer.
Cedarapids 60"x24' asphalt plant drier. Compl.
Overmander Monotrole Bit. Mixing Plant, T-34.
Model S-100 Simplicity. Diesel powered.
Hetherington-Berner Moto-Paver
Pioneer Model 101, complete. New 1948.
Barber Greene 830-840. Complete Plant.
Cummers-Road Semi-Port. 1500# Pugmill.
Cedar Rapids Travel Roadmix Plant Model 50.

CABLEWAYS

Sauerman slack line 1¼ yd.; electric 90' mast.
Sauerman 1 yd. with 100 hp. electric motor, complete.
Sauerman 1 yd. with Waukesha gas hoist.

RICHARD P. WALSH CO.

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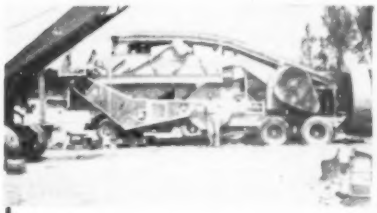

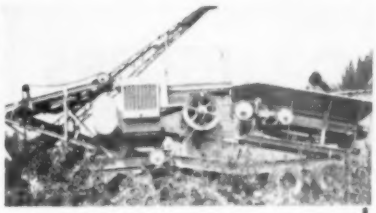

FOR SALE

1 - Portable Cedarapids Primary Jaw Crusher, 20" x 36", equipped with Caterpillar 8800 Diesel power unit, 36" x 12' apron feeder and air brakes.

1 - Cedarapids Master Tandem Crusher equipped with 10" x 36" intermediate jaw crusher, 40" x 22" tertiary roll crusher, Murphy ME-650 Diesel engine and accessory equipment.

1 - Buckeye Shovel, ¾ yard with shovel front.

All the above items less than 5 years old. Thoroughly reconditioned and available for inspection.

MITCHELL DISTRIBUTING COMPANY, Inc.

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SPRUCE PINE **NORTH CAROLINA**

IMMEDIATE SHIPMENT

CRUSHERS

18" x 36" Jaw, Traylor.
3XC Hammer, Gruendler.
5-roll Raymond, high side.
48" Symons, vert. disc.
Size 1, Allis-Chalmers.

KILNS—COOLERS—DRYERS

9' x 80' x ⅝".
7' x 160' x ⅝" (2).
7' x 120' x ⅝" (2).
610-24 Sta. Steel Roto-Louvre.
502-20 Roto-Louvre.
310-16 Roto-Louvre.
5' x 67' x 5/16".
5' x 30' x ⅜" Ruggles-Cole.
4'6" x 50' x ¼" with lifters.
4'6" x 40' x ⅜" Traylor.
4' x 35' x ½" with burner.

MILLS

23" x 12' Pug, double shaft, L.B.
4' x 20' Paddle, double shaft.
5' x 22' Tube, Smidth.
6' x 8' Abbe, ball.

MISCELLANEOUS

Classifier, Dorr, Type DSFH.
Conveyor, Apron, 34' cc., 36".
Conveyors, Belt. All sizes.
Elevators, Bucket. All sizes.
Screen, Vibrating, 4' x 7'.

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Hanover 2-4890

Machinery & Equipment Merchants

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Champion 1030 jaw crusher, roller bearings.
Traylor type H 9"x16" jaw crusher.
Gruendler 2XA hammermill, 24"x14".
Stedman B-30 hammermill, 30"x24".
Penna. SXT-8 hammermill with 125 HP motor.
Double roll stone crusher, 24"x14", smooth faces.
Bonnot double roll coal crusher, 24"x30".
Robins double roll coal crusher, 18"x24".
Dbl. roll cinder crusher, 12" dia. 18" face.
Sturtevant Fine Crusher 00 with 2 HP motor.
Hunts dbl. drum tandem hoist without motor.
Sullivan single drum 7½ HP elect. hoist.
Ing. Rand dbl. drum 5 HP elect. hoist.
5 overhead electric & air hoists.
American Standard 24" disintegrator.
40 HP 115 V DC motor, 3/60/450 volts 31.3 KVA Alternator.
Motors to 125 HP, reducers and gearmotors.
Gears, chain, sprockets, V belt pulleys.
Single deck 4'x6' vibrating screens.
Simplicity 1 deck 6'x8' scalping screen.
Single & dbl. deck new Universal screens.
Symons 1½ deck 42"x14" vibrating screen.
Crucible Steel Co. 1¼" steel rock bits.
140', 14" wide gravity conveyors with chairs.
Pumps, bin gates, trolleys.
Enclosed and open chain belt elevator.
Elevator buckets and elevator chain.
Apron conveyors: 18"x7', 24"x46', 30"x22', in frame.
Merrick conveyor scales for 16" and 30" belts.
New elevator belts from 8" to 18" wide.
Conveyor equipment for 42", 16", 18", 24", 30", 36", 42".
New and used conveyor belt up to 36" wide.
Flat belt idlers for 20" and 42" wide.
Belt tripper for 14" belt, with 2" rails.

G. A. UNVERZAGT & SONS

136 Coit St., Irvington, N. J.

YOU ALWAYS SAVE WHEN YOU BUY USED MACHINERY ESPECIALLY FROM A LONG ESTABLISHED FIRM (AAA-1 Rating)

ROTARY KILNS:
1—7' x 60' CALCINER, made by Struthers-Wells, 9/16" shell, Timken roller bearing supports, Farrel Birm, gear reducer, with V-belted AC motor, firing hood, seal ring. With Vanderwerp-Manitowoc Recuperator, in excellent condition.
1—7' x 120' and 2—8' x 120' Vulcan, with ⅝" shells.
1—6'6" I.D. x 12' Rotary Nodulizer or Furnace, ⅝" shell, Timken roller-bearing rolls, gear reducer and motor drive, scraper conveyor, feeder, etc.

ROTARY DRYERS:
8—6' x 40', 5' x 40' Ruggles-Coles; 54" x 25' Class Xf-4 Ruggles-Coles, also 3—3' x 50', 5' x 50', 6 x 60', 7 x 70' Direct Heat. Also 3—6' x 50' Louisville Rotary Steam Tube.
6—Link Belt Roto-Louvre Dryers: #207-10 (2'x7"x10"), #310-16, #503-10, #604-20, two #604-24.
3—3'x50' Rotary D.H. Dryers or Coolers.

CRUSHERS:
Jaw—2 x 6", 6 x 15" Sturtevant; 18 x 36" and 24 x 36" Farrel; 42 x 48" Traylor; Rolls: 42" x 16" Allis-Chalmers Type B; 24 x 32" Penna. single roll. Portable Plants—Cedar Rapids 1036-BBB; 2540-AAAA, 2036-AAA, also Pioneer with 30 x 42" primary and secondary crushers, all Diesel driven.

PULVERIZERS:
1—5 roll Raymond High Side.
6—#1, #0, #00, #000 Raymond Mills.
3—#0, #00, 8" Raymond Screen Mills.
2—#51 Raymond Imp Mills.
2—Mikro #2TH, #4TH.

BALL AND TUBE MILLS:
6—Hardinge Mills, 3' x 8", 5' x 22", 6' x 22", 8' x 48".
4—Tube Grinding Mills, made by Traylor E. & M. Co., Allentown, Pa. Silex lined, 4' x 13', 4'6" x 18'6", 5' x 22' and 5' x 20'.
8—Pebble Mills, porcelain lined; 3—6' dia. x 8', 800 gals. each. 1—6' x 5', 3—5' x 4', each with ball charge.

AIR SEPARATORS:
2—Raymond 6' and 16' dia.; 1—8' Gayco; 1—16' Sturtevant.

LIME HYDRATING PLANT
1—Complete Lime Hydrating Plant, incl. Kreitzer Hydrator, Raymond Pulverizer, Jeffrey Pulverizer, Hummer Screen, etc.

VIBRATING SCREENS:
3—Selectro 3' x 8' 2-deck; 1—3' x 8', 1-deck, all totally enclosed, heavy duty.
1—3' x 6' Colorado Iron Works, 1-deck.
2—4' x 10' Tyler Niagara, 2-decks.
8—Tyler Hummer, 3' x 5', 4' x 5', 4' x 10'. Also #38 4' x 10'.

DORR CLASSIFIERS:
2—2 stage Washing Classifiers, each with two rakes in tandem, in steel trough 26'6" long x 8' wide, with drives.

Only a Partial List. Send us your Inquiries for Shovels, Cranes, Draglines; Jaw, Gyratory and other Crushers; Symons and Telsmith Cones; complete Portable Crushing Plants; Rotary Kilns and Coolers; Air Compressors; Conveyors and FULL LINE OF CHEMICAL PROCESS EQUIPMENT.

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CONSOLIDATED PRODUCTS COMPANY, INC.

15-16-17 Park Row, New York 38, N. Y.

BArclay 7-0600

We buy your idle equipment

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BROOKS LOAD-LUGGERS
AND
DEMPSTER DUMPSTERS

WANTED FOR CASH

Model CH Load-Luggers, L-F Dumpsters and Buckets

GENERAL TRADERS, Inc.

2675 Grand Avenue — Chicago 12, Illinois

FOR SALE AT BARGAIN PRICES

GRAVEL PLANT WASHING AND SCREENING MACHINERY AND EQUIPMENT

1—Telsmith 20"x15 ft. sand classifier complete, very good.

18 and 20 inch conveyors and belts.

1—Acme 9½ DD Jaw Crusher #1722, 12x18 extra jaws.

1—Telsmith 8B Reduction Gyratory crusher.

1—Telsmith #28 Intercone Crusher #8170.

2—Kern 2 drum hoists 2 speed, 1 yd. and ½ yd.

3—Telsmith Plate feeders 20"x5'.

1—3'x10' Tyler Niagara Screen, 2 deck, Type 300—like new.

1—3'x8' Tyler Niagara Screen, 2 deck, Type 200—very good.

Steel storage bins, Electric welders, Electric motors from 5 to 50 H.P., sand rewashers, water pumps, bucket elevators, log washer.

Detailed list on request.

C. G. EVANS, c/o Duluth Builders Supply Co.
402 Builders Exchange Bldg.
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ROCK WOOL PLANT IN SOUTH FOR SALE OR LEASE AT REASONABLE PRICE AND ON EASY TERMS

This plant has been in continuous operation since 1946. Manager and controlling stockholder is in ill health and wishes to retire. Good opportunity for man with plenty of "know how" and energy, but very little cash, who is willing to hustle to get ahead. Give references regarding experience and character. Will the gentleman from the middle west who didn't give his name when answering this advertisement, please write again. Mail sent to address given has been returned.

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309 W. JACKSON BLVD.
CHICAGO 6, ILL.

Quarry Equipment

2036 Cedarapids AAA portable primary, diesel power.
1036/2418 Cedarapids Jr. Tandem on rubber.
Cedarapids Rock-It plant w/2025 jaw, 3033 hammermill.
4033 Cedarapids Model 4C plant. New.
2020 Cedarapids double impeller. New condition.
4024 Cedarapids roll. Rebuilt.
3018 Cedarapids roll. Rebuilt.
1036 Cedarapids jaw.
1036 Telsmith Wheeling.
10x7 Allis-Chalmers Blake type jaw crusher. Rebuilt.
#1 Cedarapids Kubit impact breaker. New condition.
B-3 Jeffery swing hammer pulverizer. Rebuilt.
60" dia. x 14' Traylor revolving screen. Rebuilt.
24" Wemco single pitch sand screw. New condition.
15 cu. yd. Cedarapids sand drag. New.
16"x90' bucket elevator.
60-ton, 2-comp., 8'x18' storage bin w/clam gates.
Special bins to your specifications.
Conveyors—18"—24"—30"—36". Also belt.

SHOVELS AND CRANES

Lorain 77, 1½-yd. diesel.
Lorain 75B, 1¼-yd. diesel.
Lorain L-50-I, 1-yd. diesel.
Lorain MC-2 Moto-Crane.
Lorain 40 truck crane on Mack 3-axle truck.
Link Belt LS85 Diesel Combination.
Unit 514, ½-yd. gasoline crawler shovel, rebuilt.
Lorain 30A, ½-yd. gas combination.

WELL DRILLS & TOOLS

Sanderson-Cyclone No. 42 well drill, new.
Sanderson-Cyclone No. 44 well drill, new.
1952 Model 40 Keystone w/truck & tools.
Used Model 42 Sanderson-Cyclone well drill on Dodge truck.

TRUCKS

27FD rear dump Euclids.

AIR COMPRESSORS

500 cu. ft. Gardner-Denver diesel, rebuilt.
365 cu. ft. Gardner-Denver. New condition.
105 cu. ft. Schramm gas powered on 4 steel wheels.
Worthington 2-stage, water-cooled, vertical 250#, 60 CFM, new condition.

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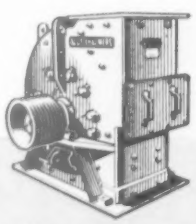

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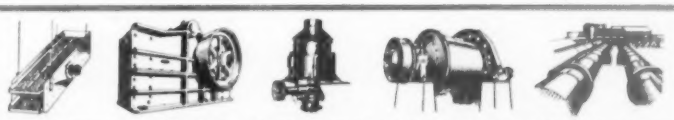

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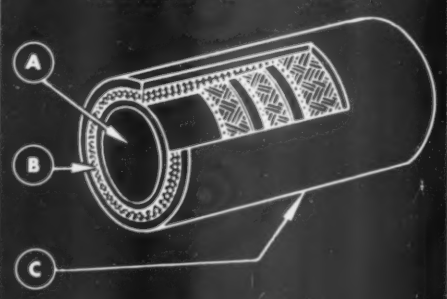

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